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ENVIRONMENTAL ASSESSMENT REVIEW PANEL

IN THE MATTER OF AN APPLICATION BY FOOTHILLS PIPE LINES (YUKON) LTD. TO THE MINISTER OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT FOR A GRANT OF THOSE INTERESTS IN THOSE AREAS OF TERRITORIAL LANDS IN THE YUKON TERRITORY AS MAY BE NECESSARY FOR THE CONSTRUCTION AND OPERATION OF THE SAID NATURAL GAS PIPELINE AND THE WORKS AND FACILITIES CONNECTED THEREWITH AND INCIDENTAL THERETO,

AND

IN THE MATTER OF A PANEL TO REVIEW THE ENVIRONMENTAL ISSUES RELATED TO THE PROPOSED ALASKA HIGHWAY GAS PIPELINE.

THE CHAIRMAN: DR. H.M. HILL

MEMBERS: DR. O. HUGHES
MR. L. CHAMBERS
MR. B.J. TREVOR
MR. C. WYKES
DR. D. LACATE

P R O C E E D I N G S

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WHITEHORSE, Y. T.

JUNE 13TH, 1977

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Whitehorse, Yukon Territory

June 13th, 1977

MR. CHAIRMAN: Well, welcome to the Environmental Assessment Panel's hearings into the Alaska Highway pipeline proposal. I would first like to introduce the Panel members for those who are not acquainted with them.

On my extreme left is Brian Trevor from Whitehorse; Lynn Chambers from Whitehorse; Owen Hughes from Calgary and on my extreme right is Doug LaCate from Vancouver; Colin Wykes from Whitehorse and I'm Harry Hill from Ottawa.

I'd like to keep the procedures for this meeting as simple as possible and as informal as possible. Each registered participant will be -- will make a presentation, after which we will have comments on that presentation from the floor and questions from the floor. The questions I hope, will be questions of clarification and we will, as a Panel, ask questions of clarification any time we consider it necessary.

Anyone who is present that hasn't registered but would like to address the Panel, would you so indicate and we will attempt to have your presentation towards the end of the day.

I'd like to announce that we will

1 have an evening session on Wednesday for those people who
2 are unable to attend during the day. I'd like to say a word
3 about our terms of reference. Originally, the Panel was
4 asked to advise the government on the environmental issues
5 related to the Alaska Highway pipeline proposal as put for-
6 ward by Foothills and that we present an interim report by
7 August the 1st because the Government of Canada and the
8 Government of the United States will be making decisions on
9 if a pipeline is to be built through Canada and if so, under
10 which pipeline and under what conditions by September the
11 1st.

12 So, our operations until August
13 the 1st are aimed at producing that interim report. We were
14 requested at our initial hearing to consider the alternatives
15 within the Yukon to the one proposed by Foothills, and
16 especially the Dempster Highway pipeline link from the
17 Mackenzie Valley to the southern Yukon pipeline, wherever
18 it may be. The logic of this was that if such a pipeline
19 were built through the southern Yukon, the contention was
20 that it's inevitable that a Dempster link from the Mackenzie
21 Valley would be proposed.

22 Consequently, we are hearing infor-
23 mation on the alternatives within the Yukon and the Dempster
24 link. Also, in order to utilize as fully as possible, the
25 in-depth analysis which has already taken place on the
26 Mackenzie Valley route, we have decided to compare the

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1 environmental issues on the two routes as far as possible
2 within the limitations of time availability.

3 For this week, we will be hearing
4 briefs and we will be making up our mind on which of the
5 issues the Panel wishes to inquire into in-depth. In July,
6 we will structure hearings in order to address those issues
7 in depth. We will decide as quickly as possible after this
8 week, which issues we will address and the sequence of those
9 issues. We will begin hearings on July the 5th on an issue-
10 by-issue basis.

11 We will publish the issues to be
12 discussed and the sequencing of those issues as soon as
13 possible after this week. The procedures for those July
14 hearings will be published at the same time.

15 You may be interested to know the
16 activities of which I am aware, that are in a way, supporting
17 the activity of this Panel. The Department of Fisheries and
18 Environment Federally, is doing an analysis of the Foothills
19 application and they are scheduled to appear -- a represen-
20 tative or I don't know how many -- but anyway, the group or
21 representative of the group is scheduled to appear in front
22 of this hearing on Friday. The Yukon Territorial Government
23 is also doing an analysis of the application and they are
24 scheduled to appear in front of us on Thursday.

25 Also, it became evident that after
26 the alternatives within the Yukon, came within our sphere of

1 analysis, that as a Panel, we wish to have a fairly in-depth
2 analysis carried out on the alternatives and their findings
3 of whoever did this analysis, presented to us.

4 Consequently, the government hired
5 a consultant, Envirocon, to compare the routes environmentally
6 This is just getting underway and it is being done at arm's
7 length to the Panel, although the studies were requested by
8 the Panel.

9 I further understand that a govern-
10 ment group is comparing the environmental characteristics of
11 the Mackenzie Valley and the Alaska Highway proposals and
12 other alternatives and this group will be present to offer
13 us advice in July. The Envirocon group will also be avail-
14 able to offer us advice on the various Yukon routes in July.

15 Well, those are my introductory
16 comments. The first participant this morning is Foothills
17 Pipe Line Company and Leo Bouckhout will present Foothills'
18 presentation. Leo?

19 MR. BOUCKHOUT: Thank you very
20 much Dr. Hill. I do have some introductory remarks which
21 have been prepared for this proceeding. They in general,
22 are descriptive remarks regarding the project, regarding
23 the environmental work done on the project and regarding the
24 implications of your expanded terms of reference.

25 First, with regards to general
26 project description, the Alaska Highway pipeline project was

1 conceived in the summer of 1976 to provide an overland pipe-
2 line system for the shipment of United States natural gas
3 from the reserve area on the Alaska North Slope to market
4 areas south of the 49th Parallel.

5 The project involves construction
6 of a forty-eight inch diameter pipeline and associated
7 facilities. In Yukon, the pipeline route generally follows
8 the Alaska Highway, some five hundred and twelve miles from
9 Beaver Creek to Watson Lake and would include installation
10 of seven compressor stations to reach a throughput of
11 2.4 billion cubic feet of gas per day.

12 The current construction schedule
13 contemplates first construction in the summer of 1979 with
14 all construction to be completed by 1983. The entire five
15 hundred and twelve miles of line and associated compressor
16 stations would be built in phases, with line construction
17 being completed in segments over two summer and two winter
18 construction seasons. We foresee all field construction
19 personnel would be housed in self-contained camps.

20 The pipeline itself would be
21 buried underground throughout its length, with the only
22 above-ground system facilities located at compressor stations.
23 At the same time that the Yukon portion is being installed,
24 some twenty-two hundred and fifty miles of the system would
25 be constructed in Alaska, British Columbia, Alberta and
26 Saskatchewan, thus the Yukon segment constitutes less than

1 twenty per cent of the overall pipeline system.

2 With regard to environmental con-
3 siderations, in the summer of 1976, Foothills Yukon retained
4 several environmental consultants to assist in the prepar-
5 ation of Environmental Statement and Atlas which formed part
6 of our application before the National Energy Board. These
7 consulting firms included Beak Consultants Ltd. who dealt
8 with biological air and water quality topics; Klohn Leonoff
9 Consultants Ltd. who dealt with terrain and water related
10 topics; Lifeways of Canada who dealt with archaeology; The
11 Lombard North Group Ltd. who dealt with land use, aesthetics,
12 recreation implications; and Vaartnou and Sons Enterprises
13 Ltd. who dealt with vegetation and revegetation related
14 topics.

15 Part of the task of preparing the
16 Environmental Statement and Atlas was to identify information
17 deficiencies which were relevant to pipeline planning. We
18 have found that more information exists than was originally
19 uncovered in preparing the Statement and Atlas and this is
20 being incorporated into the data bank as it becomes available.
21 In order to overcome other deficiencies in specific field
22 data, Foothills, with the aid of its consultants, began a
23 series of field studies in the Fall of 1976. To date, the
24 following studies have been completed:

25 First, the Fall inventory of fish
26 in streams and rivers along the pipeline route, conducted in

1 the fall of '76; an assessment of waterfowl fall staging and
2 migration patterns, conducted in the fall of 1976; a winter
3 ungulate survey, conducted in the winter of 1977; a winter
4 fish survey in the area designated for winter construction,
5 conducted in 1977; an assessment of waterfowl spring staging
6 and migration, conducted in the spring of 1977; and an
7 aquatic assessment of proposed river and stream crossings,
8 conducted in the spring of 1977, and it's just been completed.

9 We have a short progress report
10 on the spring waterfowl surveys available now which I would
11 like to make available to the panel. Mr. Roe, the primary
12 investigator, is currently in the field on the summer pro-
13 gram and therefore, will be unable to complete his report
14 on the spring program until later on this summer. The final
15 report on the spring fish investigation is being prepared
16 and should be available in early July.

17 Now, with respect to making the
18 progress report on the spring waterfowl investigation avail-
19 able, I will do so hopefully, late this afternoon or tomorrow
20 when my baggage catches up to me.

21 Three additional field investiga-
22 tions are currently underway. A summer bird study, in-
23 cluding the location of raptor nest sites and assessment of
24 waterfowl production along the entire route. Mr. Roe, who
25 I mentioned earlier who had done the spring waterfowl work,
26 is currently undertaking this work for us and is in the field

1 currently.

2 A summer/fall mammal investigation
3 with emphasis on ungulates and aquatic furbearers, is
4 currently underway. The first survey in fact, is underway
5 right now.

6 Revegetation field tests are under-
7 way in the vicinity of Haines Junction. We have just in-
8 stalled the test plots over the last several weeks. In
9 addition to this, we are continuing our revegetation tests
10 in Northeastern British Columbia on existing pipeline systems.
11 These were begun just over a year ago and are also applicable
12 to the Alaska Highway pipeline route.

13 Much of the work done by various
14 investigators for other northern projects, is also applicable
15 to the Alaska Highway pipeline project, as is the experience
16 gained through other civil construction in the general project
17 area.

18 All of the work being done now is
19 directed toward obtaining definitive field data which is
20 necessary for the development of detailed site specific pro-
21 tection measures. Such protection measures may take the
22 form of route and facility site location refinements, con-
23 struction timing constraints, special design measures,
24 special preconstruction and construction procedures, implem-
25 entation of contingency plan measures, or development of
26 particular rehabilitation plans. All such protection measures

1 will be developed and reviewed by appropriate regulatory
2 agencies before construction begins in the applicable area.
3 The same is true for special measures such as environmental
4 orientation, inspection and monitoring programs.

5 Dr. Hill, the Chairman of this
6 E.A.R.P. panel has already noted that, should Foothills'
7 project be certified, a more detailed environmental review
8 would follow.

9 Additionally, the Gas Pipeline
10 Regulations, issued pursuant to the National Energy Board
11 Act, provide for matters which must be resolved after an
12 authority is received and before construction begins. Thus,
13 the N.E.B. may issue a certificate conditional on resolution
14 of any outstanding environmental issues.

15 Finally, with respect to the
16 panel's expanded terms of reference. We note Dr. Hill's
17 announcement that "the terms of reference of the panel have
18 been changed to allow it to consider other alternatives."
19 In this context, Foothills will participate to the fullest
20 in assisting the Panel in any way possible.

21 As you are aware, Foothills, at
22 the request of the National Energy Board, prepared a report
23 on the financial and technical feasibility of a Dempster
24 Highway pipeline connection to the Mackenzie Delta entitled,
25 "Studies Related to Alternate Methods of Connecting Mackenzie
26 Delta Gas."

MR. CHAIRMAN: Before we -- I ask

1 for comments on the opening address by Foothills, I would
2 like to make available this schedule of the presentation
3 schedule. Following Foothills, we will have a presentation
4 by Canadian Arctic Gas, Mr. Helmut Grundberg, who was
5 scheduled to be second, will not be speaking today. He is
6 out of town.

7 After Canadian Arctic Gas, will
8 be the Yukon Outfitters Association and after the Yukon
9 Outfitters Association, will be the Kusawa Outfitters.
10 Copies of the schedule are available, Brian? Oh, there
11 is one posted on the door. Okay, there is a copy of the
12 schedule posted on the door.

13 Okay, I'd like to now open the
14 meeting for comments on the presentation by Foothills.
15 First of all, is there any comments from Panel members or
16 questions of clarification? Mr. Trevor?

17
18 MR. TREVOR: Mr. Bouckhout, you
19 referred to field investigations which are currently under-
20 way and you listed some are for mammal investigations with
21 emphasis on ungulates and aquatic furbearers. I take it
22 from your remarks on those studies, that these have just
23 begun and therefore, the details on the fore part of the
24 program would not be available to this Panel, is that
25 correct?

26 MR. BOUCKHOUT: That's right.

1 That's right, Mr. Trevor.

2 MR. CHAIRMAN: Mr. Wykes?

3 MR. WYKES: Mr. Bouckhout, the
4 survey that was just completed on the aquatic assessment of
5 proposed river and stream crossings, in that report, did you
6 address the toxicity of gas to aquatic life at all or if
7 not, where is that information available?

8 MR. BOUCKHOUT: In that particular
9 report, I don't believe the toxicity of natural gas to
10 aquatic life will be addressed. I believe and I've been
11 searching my recollection for a couple weeks now, that
12 something has been done on that. In fact, some laboratory
13 experiments have been performed on the toxicity of natural
14 gas in a laboratory setting to fish in particular. We've
15 been attempting to find that particular report and have been
16 unable to to this date.

17 We are exploring the possibility
18 if we cannot find it, to undertake such a task ourselves.

19 MR. WYKES: One other question.
20 The revegetation studies at Haines Junction -- are you
21 looking at trees, grasses -- what are you looking at in
22 terms of revegetation?

23 MR. BOUCKHOUT: In the re-
24 vegetation test sites at Haines Junction, the procedure is
25 generally somewhat similar to the procedure we are using
26 in Northeastern British Columbia. We are primarily testing

Mr. L. Bouckhout
Mr. C. Wykes
Dr. D. LaCate
Mr. D. Westworth

'13

1 native seed stock of which we have a contract with our con-
2 sultant to produce commercial quantities for our pipeline
3 purposes.

4 We are also undertaking tests on
5 shrubs. We have not to my knowledge at this time, under-
6 taken or will be in the immediate future, undertaking tests
7 on trees per se. So we're talking about shrubs and grasses.
8 I could get further clarification from our consultant who
9 happens to be here if you wish.

10 MR. WYKES: Thank you.

11 MR. CHAIRMAN: Mr. LaCate?

12 DR. LaCATE: Mr. Bouckhout, I
13 notice that you have listed three additional field investi-
14 gations that are currently underway. Are you also planning
15 additional field studies, soil tests and drilling --
16 anymore studies on terrain sensitivity this summer?

17 MR. BOUCKHOUT: Yes sir, those
18 are being considered, however, they have not been approved
19 as yet. There are several other studies which we have under
20 consideration currently.

21 MR. CHAIRMAN: Okay, I'll open
22 the meeting to floors -- questions from the floor. Would
23 you please identify yourself and you can either use the
24 microphones at the table here or the microphone among the
25 audience.

26 MR. WESTWORTH: David Westworth,

1 Yukon Wildlife Branch. I'd like to ask Mr. Bouckhout to
2 please amplify on the nature and extent of aquatic furbearer
3 studies being undertaken this summer.

4 MR. BOUCKHOUT: Yes, Mr. West-
5 worth, the studies will be undertaken or are being undertaken
6 by Beak Consultants Ltd., who have undertaken our previous
7 mammal studies. With respect to aquatic furbearers in par-
8 ticular, the studies will be concentrated in the fall in
9 terms of aerial surveys for beaver and muskrat and so on.

10 Additionally as I mentioned, we
11 do have a summer bird program underway currently. The in-
12 dividual charged with undertaking the bird program is in-
13 vestigating various wetland complexes for water waterfowl
14 production and at the same time, he will be undertaking to
15 gather information on aquatic furbearers in the same wetland
16 complexes.

17 MR. CHAIRMAN: Is there anybody
18 else that wishes to comment?

19 DR. MCCART: Peter McCart
20 representing -- or here as a consultant to Arctic Gas. I
21 just wanted to ask whether, in the hearings here, we'll
22 be considering any of the Alaskan portion of the route. Is
23 this part of the purview of the hearings or are we to con-
24 sider only the Canadian portion or only that portion within
25 the Yukon?

26 MR. CHAIRMAN: The terms of

1 reference of this Panel are to consider only the portion
2 within the Yukon.

3 If there is no more comments,
4 thank you very much Mr. Bouckhout.

5 MR. BOUCKHOUT: Thank you.

6 MR. CHAIRMAN: And I'll ask Mr.
7 Roe of Canadian Arctic Gas to make his presentation.

8 MR. ROWE: Mr. Chairman, members
9 of the Panel, ladies and gentlemen, my name is Doug Rowe.
10 I am here representing Canadian Arctic Gas from Calgary. I
11 would like to submit to the Panel, a Statement of Arctic Gas
12 position relative to the Alaska Highway pipeline route. It
13 is entitled 'Arctic Gas Environmental Comments on the
14 Alaska Highway Gas Pipeline Project' and copies have been
15 submitted to Mr. Timmerman.

16 I will read the opening statement
17 in the report and then introduce some members of our con-
18 sulting staff who are on hand who will be able to clarify
19 some issues if questions arise.

20 After consideration of the envir-
21 onment evidence submitted by the sponsors of the Alaska
22 Highway pipeline route, it is Arctic Gas' conclusion that
23 there are insufficient data upon which to base a scientific
24 assessment of the environmental impact of this project.

25 A minimum of two years of study
26 is necessary in order to bring the baseline data to a point

1 where realistic preliminary design and construction planning
2 can be effected. By way of comparison, Arctic Gas has seven
3 years of environmental data upon which to base design and
4 planning concepts.

5 The levels of activity proposed by
6 Foothills this year are inadequate to provide the information
7 which is require to enable adequate environmental assessment
8 and input to design. The level of environmental effort
9 proposed by Foothills for this year, reference to Mr.
10 Bouckhout's testimony, is approximately one-half that proposed
11 by Arctic Gas for the same period.

12 If Arctic Gas expended no further
13 efforts towards environmental research, at the current level
14 of Foothills' effort, it would take approximately thirty
15 years to equal the Arctic Gas environmental expenditure and
16 effort. Although it is realized that the expenditure of
17 funds is not the only indicator of the adequacy of environ-
18 mental work, we mention it as an indication of the magnitude
19 of the problem. It is also an indication of the sensitivity
20 of management to environmental concerns.

21 There has been no evidence sub-
22 mitted on research which has been done by the sponsors
23 related to environmental concerns specific to the Dempster
24 Lateral. It is Arctic Gas' contention that the highway
25 poses by far, the most serious threat to the environment of
26 this region, in particular, the Porcupine Caribou herd.

1 However, the design and planning of mitigative techniques
2 for a pipeline, route alignment, scheduleding, et cetera, also
3 require considerable research.

4 Arctic Gas has conducted some
5 pipeline-related studies in this area and bases its opinions
6 of potential environmental problems on advice from Mr.
7 Jakimchuk of Renewable Resources concerning mammals and from
8 Dr. McCart of Aquatic Environments on aquatic resources.

9 Under the requirements of the
10 Environmental Impact Assessment Guidelines for Oil and Gas
11 Pipelines, E.A.R.P. 1976, Section 2.4 states:

12 "The relationship of the proposed pipeline to
13 other existing or proposed projects, including
14 those not controlled by the initiator, should
15 be discussed. This section should also iden-
16 tify the possible environmental concerns that
17 might arise through the stimulated development
18 of associated projects. The possibility of a
19 shared corridor should be discussed."

20 Under the Expanded Guidelines for
21 Northern Pipelines, June, 1972, the Federal Government
22 expresses a preference for "the establishment of a 'corridor'
23 to enclose trunk oil and gas lines." It would thus seem
24 reasonable for the applicant to include comprehensive
25 data supported by valid research, which would assess the
26 potential impact of this corridor.

1 The spectre of construction and
2 operation of a highway, construction and operation of a hot
3 oil pipeline, and the construction of a gas pipeline through
4 the wintering range of the Porcupine caribou herd and across
5 their major migration route must be considered in full
6 awareness of the potential synergistic impacts such concen-
7 trated development may have on the Porcupine herd.

8 Not only is this area essential
9 to the survival of the Porcupine caribou herd, but the
10 alignment also passes through considerable sensitive habitat
11 which merits extensive study.

12 The 1972 Pipeline Guidelines con-
13 tain the following requirement relating to pipeline monitor-
14 ing.

15 "that an effective pipeline performance
16 monitoring system of inspection and instrum-
17 entation be established to ensure operational
18 performance in keeping with the above-stated
19 environmental concerns."

20 Monitoring, if it is to be valid,
21 must relate ongoing sampling of selected environmental
22 parameters to establish baseline data, in order to determine
23 changes directly attributable to pipeline activities. The
24 use of control and experimental (in this case, related to
25 pipeline disturbance) techniques is essential.

26 It is also essential that the data

1 base encompass several years of undisturbed research in order
2 that natural population dynamics be better known. Otherwise,
3 the monitoring of any parameter becomes scientifically mean-
4 ingless as a tool for ensuring acceptable environmental
5 performance.

6 The sponsors of the Alaska Highway
7 route should undertake monitoring studies immediately and
8 allow sufficient time for adequate baseline information to
9 be established. An example of this type of study is a multi-
10 disciplinary monitoring research established at Chick Lake,
11 Northwest Territories, by Arctic Gas in 1973. This work
12 indicates that effective monitoring must be assessed against
13 a continuous data base of several years.

14 Of critical importance in terms
15 of the risk of unacceptable environmental alteration, is
16 the portion of the route which passes through the proposed
17 extension of the Kluane National Park. By definition, this
18 land must preclude all unacceptable environmental impacts.
19 Extremely comprehensive research and study are required in
20 this area in particular. It would be unforgivable to
21 prejudice the future of this area by ill-conceived or poorly
22 executed development.

23 A buried gas pipeline crossing
24 different terrain materials and topographic settings, can be
25 affected by a wide variety of geotechnical problems. These
26 geotechnical problems relate to:

- (1) Slope stability.
- (2) River crossings.
- (3) Frost heave.
- (4) Thaw settlement, and
- (5) Drainage and erosion control.

Of these geotechnical problems -- all these geotechnical problems can affect the environment and the pipeline if they are not adequately considered prior to design and construction planning. Field changes to design or construction techniques, which occur during construction, due to inadequate field research in the planning phase, often are accomplished at the expense of optimal environmental protection.

An important mitigative measure necessary for the maintenance of environmental quality is revegetation. To implement such a program, it is necessary to have a thorough knowledge of the terrain, soil and climatic factors which affect plant growth in the project area; integration of design with geotechnical drainage and erosion control plans; and materials available to implement the plan.

The review of literature and preliminary reconnaissance undertaken by the Alaska Highway pipeline group, serves only to provide a qualitative overview of the region and does not satisfy the requirements of even a preliminary revegetation plan. An undertaking to

1 satisfy this requirement would need one and possibly two,
2 field seasons with several field crews to complete.

3 The necessary seed of agronomic
4 and/or wild native species suitable for revegetation in
5 northern mountainous regions is not available on the
6 commercial market. The special agronomic varieties require
7 a lead time of two to four years for delivery. Arctic Gas
8 has had seed multiplication contracts with certified growers
9 since 1972, in order to be assured of sufficient quantities
10 to meet its specific revegetation requirements.

11 The sponsors of the Alaska Highway
12 route have failed to demonstrate that they could be ready
13 to implement a major revegetation program in less than five
14 years.

15 The sponsors of the Alaska Highway
16 pipeline route have not demonstrated that their project could
17 be built with an acceptable environmental impact. On the
18 contrary, the environmental materials the Alaska Highway
19 project sponsors filed with the National Energy Board,
20 revealed the tremendous shortcomings in biological knowledge
21 for the region traversed by the pipeline route.

22 This position regarding the in-
23 adequacy of the filed information, was supported by the
24 prepared direct testimony of Messrs. Williams and Klassen
25 of the Yukon Conservation Society. Commissioner Pearson,
26 also a biologist, testified that the information provided

1 by Foothills (Yukon) was inadequate to assess impact.

2 A minimum of two years' intensive
3 field investigation would be required to develop an accurate
4 prediction of environmental impact and the appropriate
5 mitigative measures. Further time would likely then be
6 required to refine design and construction practices to
7 reflect these environmental sensitivities.

8 Foothills (Yukon) consultants
9 agree that these studies are required, as is evidenced in
10 their response to cross-examination and Arctic Gas data
11 requests. When cross-examined by CYI Counsel Veale at
12 Whitehorse, Foothills (Yukon) witness Krochak admitted
13 that:

14 "We have recommended to Foothills that two
15 years of studies should be conducted and we
16 feel that within that two years and the study
17 program that we are putting together, that
18 that would be a sufficient time to gather
19 the information that we need."

20 The predictions of impact for the
21 Alaska Highway pipeline route rely heavily on the premise
22 that, because it follows an existing utility corridor, there
23 will be no significant environmental impact resulting from
24 construction, operation or maintenance.

25 There is no inherent advantage to
26 the corridor concept. Each corridor must be evaluated on

1 its own merits before the additional impact of a pipeline
2 in that corridor may be deemed environmentally acceptable
3 or found to be unacceptable. Furthermore, the Alaska High-
4 way pipeline route diverges from the Alaska Highway right-
5 of-way by approximately five miles or more for twenty per
6 cent of the total route in the Yukon.

7 In fact, although no evidence has
8 been submitted by Foothills on this issue, it may well be
9 that due to synergistic effects, the combined impact of the
10 pipeline and highway where they are juxtaposed, may be
11 greater than the sum of the two considered separately.

12 Appended to this Statement, are
13 specific areas of deficiencies which Arctic Gas feels are
14 relevant and important.

15 I'd like to thank the Panel for
16 the opportunity of presenting this brief for Canadian Arctic
17 Gas. I would also like to answer any questions which may
18 help to clarify some of the points covered in this Statement.
19 In order to assist me to answer some of these questions, I
20 have with me some of our biological consultants. I should
21 introduce them.

22 They are Ron Jakimchuck, Renewable
23 Resources Consulting in Edmonton. Ron has been with the
24 project since 1971. He's well into the latter part of a
25 decade of study on the Porcupine caribou herd and is very
26 conversant with that particular phase or segment of the

1 environment in particular. Peter J. McCart of Aquatic
2 Environments in Calgary has been working as a consultant
3 to Arctic Gas since 1972 in the fisheries area. Prior to
4 that, from 1969, he was working on the North Slope for the
5 Alyeska people with regard to development -- fisheries
6 related studies on the North Slope.

7 Dr. Tull from L.C.L. Ltd. in
-8 Edmonton, one of the ornithological consultants to Arctic
9 Gas is also here.

10 Unfortunately, Don Dabbs of
11 R.M. Hardy and Association -- and Associates rather, our
12 revegetation consultant, was unable to make it due to a
13 family illness. Also absent are Dr. Banfield of Brock
14 University and Dr. Gossen of Arctic Gas staff who have
15 other commitments but who will be here on the July session
16 starting on July 5.

17 Again, thank you and and we'd
18 be happy to answer any questions.

19 MR. CHAIRMAN: Thank you very
20 much. Unfortunately, I just received their brief and I
21 haven't been able to read the addendum. We -- would it be
22 possible to, after we've had a chance to read it, to ask
23 some questions of the authors? How long will they be here,
24 just today or --?

25 MR. ROWE: Yes, they were planning
26 on leaving this afternoon, but if there are some requirements

1 that they be here, we can arrange that they stay.

2 MR. CHAIRMAN: I'll discuss it
3 with my colleagues and see what we can --

4 MR. ROWE: Fine. Part of this
5 testimony was prepared by Drs. Banfield and Gossen who
6 are unable to be here at this time but would be available
7 in the July session for questioning at that time.

8 MR. CHAIRMAN: Thank you.
9 Are there any questions of clarification from the Panel
10 members? I see they're all busily reading.

11 I notice that you state that the
12 area traversed by the Dempster Highway is essential to the
13 Porcupine caribou herd. Could you elaborate on that for
14 my benefit?

15 MR. ROWE: Certainly. I'd like
16 to defer that question to Mr. Jakimchuk.

17 MR. JAKIMCHUK: You may be sorry
18 that you asked that question. I'm trying to integrate seven
19 years of information and give you a reasonably short and
20 lucid answer, however, it's -- there is always dangers in
21 oversimplifying.

22 The area from approximately Chapman
23 Lake on the Blackstone River, right through to the eastern
24 slopes of the Richardson Mountains, is winter range -- con-
25 stitutes winter range, one of the two prime winter range
26 areas and crosses two of the main migratory routes of the

1 hundred and ten thousand strong Porcupine herd.

2 The area is utilized -- with one
3 exception - it has been utilized every year in the last
4 seven years by the bulk of the herd and that was in 1973,
5 when the majority of the herd wintered in the east fork of
6 the Chandalar Drainage in Alaska. The Dempster route
7 and the pipeline that would follow that is crossed twice
8 annually by the herd. In the fall migration and in the
9 spring migration.

10 Of particular importance and
11 significance, is the concentrated migration northward
12 through the Richardson Mountains which takes place along a
13 very narrow corridor. So we have then, this caribou popu-
14 lation that has been the focus of a great deal of attention
15 by the Berger Inquiry, by the Litt Inquiry in Washington, by
16 the President's Council of Environment Quality in Washington,
17 even by the California Energy Board and now, this Inquiry,
18 has been the focus of a great deal of attention. We have a
19 highway and a proposed pipeline traversing some of these
20 key ranges.

21 I have no hesitation whatsoever,
22 and, given the opportunity, I would like to elaborate upon
23 potential impact. I have no hesitation whatsoever, in saying
24 that this is indeed a very vital area for the Porcupine
25 herd. In fact, in 1972, when I was asked by Arctic Gas to
26 express a preference for a coastal route across the Yukon

1 versus an inland route through the Canning Valley and north
2 of Old Crow for the Arctic Gas pipeline, I specifically
3 preferred the coastal route to avoid some of the interactions
4 with the herd during their migratory periods.

5 So, we have winter range and we
6 have two major migratory routes involved in that segment of
7 the routing.

8 MR. CHAIRMAN: You stated that
9 the caribou herd comes together to cross the Richardson
10 Mountains and did I read you correctly, that they have
11 actually crossed the Richardson Mountains six years out of
12 the last seven?

13 MR. JAKIMCHUK: Yes.

14 MR. CHAIRMAN: And this concentration
15 goes through a pass in the Richardson Mountains all the
16 time or --

17 MR. JAKIMCHUK: It's the migration which
18 might involve anywhere up to thirty, forty, fifty thousand
19 animals -- takes place right along the spine virtually of
20 the Richardson Mountains and through many of the passes.
21 It's on a north/south axis. It's not a migration across.
22 The Richardson Mountains are running north/south, basically
23 a travel route from their wintering range -- some of the
24 animals winter in north of the Dempster, they don't have to
25 cross that, but large numbers also winter south of the
26 Dempster Highway and this is a major north/south route to

1 the calving grounds on the Yukon and Alaska North Slope.

2 MR. CHAIRMAN: And, I am no
3 biologist so I ask these questions with little background.
4 The -- are the reasons understood why the caribou herd
5 would choose to winter in Alaska rather than along the
6 Richardson Mountains?

7 MR. JAKIMCHUK: I wouldn't say
8 they're definitively understood, however, virtually every
9 year there is some herd component that utilizes the winter
10 range in the east fork of the Chandalar. Winter range as
11 characterized by taiga with a heavy component of lichen,
12 their prime winter range has old stands of lichen. These
13 conditions are found in the Alaska side as well as on the
14 Canadian side, particularly in the Eagle Plains area.

15 Periodically, they do -- either a
16 component or a large component of the herd will winter in
17 Alaska and that -- my interpretation of the reason for that
18 is the differences in snow conditions. They have to paw
19 through the snow to forage and they are very responsive in
20 their localized movements in the winter to snow hardness,
21 crusted snow, texture and so on. So that the reason for
22 variability in winter range utilization, I feel, is largely
23 a function of snow condition in any given year.

24 MR. CHAIRMAN: Questions from
25 other Panel members? Mr. Trevor?

26 MR. TREVOR: I'm interested in

1 your expression of opinion related to the coastal route as
2 opposed to the Interior route as to why you gave that
3 opinion, recognizing that the coastal area is the calving
4 grounds for this herd. Could you comment further on that
5 please?

6 MR. JAKIMCHUK: Well, it was
7 after a great deal of examination. I gave a preliminary
8 opinion on that in 1972 and this was predicated on a certain
9 mode of construction and a certain time window being avail-
10 able for construction on the coastal plain. In other
11 words, winter construction when the animals are not there and
12 may be a hundred and fifty miles or two hundred miles re-
13 moved from the pipeline right-of-way and predicated on the
14 guarantees or commitments made by Arctic Gas, that there
15 would be no summer construction activity and no activity
16 on the calving grounds during the calving period.

17 There is another aspect to this
18 equation and that is, we have also conducted detailed studies
19 in the Brooks Range, particularly the Canning River Valley
20 which is a representative of some of the narrow northern
21 valleys in extremely rugged country and found them to be in-
22 ordinate rich in mammalian fauna. So that if one were to
23 construct through a valley, one would not have a time window.
24 You have animals on winter range -- moose -- you have
25 restricted habitat valleys or travel routes for grizzly
26 bears, other carnivores such as wolves and so on and at that

1 time, it was my judgment which is still my judgment, that
2 the possibility of minimizing and avoiding impact is greater
3 with winter construction across the North Slope than it is
4 with any pipeline through a mountainous area where there are
5 no time windows to implement or very few time windows to
6 implement feasible mitigative measures if you plan to build
7 a pipeline.

8 That was the basis of my original
9 judgment which has been confirmed with studies we've carried
10 out over the years since and I testified extensively on that
11 before Justice Berger. He didn't concur with my view in-
12 cidentally, but I would like to point out that there is some
13 very useful information on that Berger record where the
14 opinions of other caribou biologists such as Dr. Bergerod,
15 Dr. Caelif, Dr. Cowan -- are also expressed with respect
16 to actual impacts on a coastal route.

17 Their opinions are there. They have
18 not shown up in the Berger Report itself.

19 MR. TREVOR: Well, if we are
20 looking at the one particular area and that is the migration
21 north/south along the spine -- or south/north along the
22 spine of the Richardsons, what period of time would this
23 encompass?

24 MR. JAKIMCHUK: The period of
25 September, October and of course, the caribou settle in on
26 their winter range there. They're apt to all be there for

1 the duration until March. The spring migration will
2 commence in March, April -- take place over March, April and
3 May, progressing northward. So, basically, the caribou after
4 calving in the North, engage in some summer movements and
5 they migrate south to their winter ranges and that's the
6 September, October period. They stay in the general
7 vicinity and move around throughout large areas of habitat
8 such as I've mentioned on the Eagle Plains in the Ogilvie
9 Mountains for the duration of the winter and then group up
10 again in the spring for this spring migration north to
11 calving.

12 MR. CHAIRMAN: Mr. Hughes?

13 MR. HUGHES: That particular
14 narrow route that you referred to, I take it is, we're
15 dealing there with the as yet, uncompleted portion of the
16 Dempster Highway?

17 MR. JAKIMCHUK: Unfortunately,
18 and much to my chagrin, ten or twelve days ago, I flew
19 the Dempster Highway and I have found that it has penetrated
20 the Richardson Mountains entirely. It is on the last height
21 of land before it slopes down to join up at the Eagle River
22 bridge and there are caribou trails on either side of that
23 that have been overlain by the fill of the highway.

24 That highway very quietly got
25 constructed through that area with very little examination.
26 I might also add -- make another point -- and that is the

1 Richardson route is not the only migratory corridor along
2 the Dempster Highway. There is another movement that takes
3 place summer and fall in the vicinity of once again, Black-
4 stone River, just to give you some general idea. Up through
5 the Eagle Plains, through the Keno Mountain Range and past
6 Old Crow. We call that the Old Crow route. We call the
7 other one the Richardson route, so there are actually two
8 major migratory corridors involved.

9 MR. CHAIRMAN: Mr. Wykes?

10
11 MR. WYKES: Mr. Rowe, in your
12 Statement, you mentioned that it's Arctic Gas' contention
13 that the highway poses by far, the most serious threat to
14 the environment in the Dempster. What, in your mind or in
15 Arctic Gas' mind, are the other major environmental in-
16 adequacies or gaps where research would be needed in order
17 to construct a pipeline in that part of the country?

18 MR. ROWE: Well, Mr. Jakimchuk
19 could perhaps speak to the mammals area -- other mammals
20 other than the caribou for example, and perhaps Dr. McCart
21 could elaborate on his concerns on aquatic resources; and
22 perhaps Dr. Tull on the -- one of the ornithological short-
23 comings in that area.

24 MR. JAKIMCHUK: Briefly, I could
25 state that with respect to mammals, some of the important
26 species and populations for which there is not a great deal

1 known at the present time, are Dall sheep along that route.
2 I saw sheep trails a couple weeks ago when I was up there
3 and the very narrow gap through which the highway and the
4 Ogilvie River pass. There are Dall sheep populations in
5 the Ogilvie Mountains. These have to be delineated, they
6 have to be -- their habitat components have to be assessed,
7 mineral licks, lambing ranges and so on.

8 There are moose occupying the --
9 virtually all of the river bottoms where there is a willow
10 present. Another important species in the Richardson
11 Mountains is the barren ground grizzly bear and that is one
12 that I would assign some attention to in any impact assess-
13 ment. Then of course, we have an array of other mammalian
14 considerations such as both terrestrial and aquatic fur-
15 bearing mammals and their habitats. That type of work should
16 be done with sufficient intensity to establish proper pro-
17 tective measures.

18 MR. ROWE: Perhaps I could ask
19 Dr. McCart to comment on the aquatic components.

20 DR. MCCART: I'd say that as far
21 as the instrument, we have only a very sketchy
22 idea of what

23 -- (Unintelligible due to technical troubles) --
24
25
26

1 - greyling as an example, are a species which have sometimes
2 very complex migratory patterns. They utilize different
3 streams at different times of the year as over-wintering
4 areas, spawning areas, rearing areas for the young, a
5 certain segment of the population may be hundreds of miles
6 removed from another segment. The young may be in one
7 stream for example, where they would spawn, and the adults
8 may be hundreds of miles away, having left the spawning
9 area.

10 This is the kind of information
11 that we need if we're going to be able to assess what the
12 impact of the Dempster Highway might be. I would like to
13 point out that the Alaska Pipeline Review Panel has correctly
14 identified the problem of streams parallel to pipeline
15 routes. As a fisheries biologist, we're concerned about
16 -- among other things, the problem of sedimentation, oil
17 spills and things like this.

18 We have always gone on the
19 assumption that where a pipeline route passes -- crosses a
20 stream at right angles, the likelihood of damage to that
21 system -- stream system -- is much less than where a pipe-
22 line parallels a stream system for a considerable distance.
23 If we look at the routing of the -- the preliminary routing
24 I should point out -- of the Dempster pipeline route, there
25 are approximately two hundred and eighty-six miles in which
26 the pipeline parallels within a mile or so, a drainage.

1 This is something like forty per
2 cent of the route then, is closely parallel to streams, so
3 I see that as a problem with that particular routing.

4 DR. HULL: The situation with
5 respect to birds along the Dempster Highway, we haven't
6 looked at that highway route and we're really not aware
7 what birds are occurring along there and what kind of
8 densities. You would want to know what raptures were
9 breeding along there, where traditional nest sites of
10 peregrine falcons in particular, also gerfalcons.

11 You would also want to know what
12 areas along the route are utilized by waterfowl for breeding,
13 staging, moulting areas. Ron Jakimchuk tells me there is
14 an area between Dawson and Whitehorse is quite heavily used
15 by waterfowl. We haven't looked at it ourselves. These
16 sort of concerns we would have to look into before we could
17 assess what the impact would be.

18 One of the most useful documents
19 we see on the Alaska Highway is the one prepared by the
20 Alaska Highway Pipeline Panel and we would like to see a
21 similar thing like that prepared for the Dempster Highway,
22 that really carefully evaluates what areas along the route
23 there are that are of importance to birds.

24 MR. JAKIMCHUK: If I may just
25 add. I just had an opportunity yesterday to read a report
26 by -- on mammals by the Alaska Highway Pipeline Panel, a

1 group out of Winnipeg. We've no author on the report and I
2 found it to be a very good characterization of what the
3 problems are and what populations are involved. I found it
4 supportive of many of the things I've been saying over the
5 years, with respect to inland routes.

6 MR. ROWE: There are a couple
7 of other areas that I might mention where we would propose
8 work, were we to say initiate a program similar to that
9 which we have done for the primary routes on Arctic Gas.

10 One of them of course, is revege-
11 tation. Mr. Dabbs may be able to speak to that later on,
12 but it would involve fairly complex surveys, relating the
13 surveys -- the information from the surveys -- to the con-
14 struction techniques, identifying problem areas, slope
15 stability, particular plant communities, revegetation rates,
16 fertilizer rates, preparing seed specifications from that,
17 going out to certified growers and so on, to get the required
18 seeds.

19 Another area that we have done
20 quite a bit of work in, is water use -- construction, pipeline
21 construction in particular. A gas pipeline has a use -- a
22 requirement for large volumes of water, in particular --
23 particularly rather, for hydrostatic testing of the line as
24 well as the camp, supportive of the camp facilities and so
25 on. There are a certain -- only a certain number of streams
26 in certain areas that you can withdraw water from and in

1 particular in the winter, where you may have over-wintering
2 populations and so on where you would be reducing their
3 possibility of survival by withdrawing large quantities of
4 water.

5 That survey should be undertaken
6 I believe. Also, air quality baseline studies to find out
7 what the atmosphere conditions are at the moment so that
8 you would be able to evaluate the emission problems from
9 compressor stations and so on. Monitoring studies as
10 mentioned in the text of our Statement, according to the
11 Guidelines -- the 1972 Government Guidelines, the Government
12 is -- the Federal Government is very concerned about
13 monitoring and being able to identify what the impacts of
14 construction are, once they've taken place. Of course,
15 in order to do that, you have to know the situation prior
16 to development and monitoring is a very complex project.

17 As I mentioned at Chick Lake --
18 Renewable Resources, Aquatic Environment, L.G.L. and R.M.
19 Hardy have undertaken a multidisiplinary study in this
20 particular area to try and set up control and experimental
21 plots, and it is a very difficult job to establish a meaning-
22 ful monitoring program.

23 Perhaps Mr. Jakimchuk could high-
24 light this, but this is something that we have wrestled with
25 quite a bit.

26 MR. JAKIMCHUK: The type of moni-

1 toring we are talking about is not surveillance. It's not
2 the eyeball approach to seeing if you can discern environ-
3 mental problems. We set up control and experimental plots
4 in the vicinity of Chick Lake for the various discipline.

5 In order to ascertain once a pipe-
6 line was built, what in fact, were the impacts, we're looking
7 at many environmental components. We chose small mammals
8 in our mammal group for example. We had the experimental
9 plot set up where the pipeline would pass through and a
10 control plot set up where there would be no disturbance and
11 we spent numerous years, as a matter of fact, we're still
12 carrying it on in a small way since 1973 to now, generating
13 baseline information to establish what natural variability
14 is in populations. How they fluctuate from season to season
15 and year to year, so that we would have a baseline upon
16 which we can then measure actual affects of a perturbation
17 through the experimental plot.

18 This is what we have been involved
19 with. It's basically, experimental research.

20 MR. CHAIRMAN: Does any other
21 Panel members have questions? Mr. Trevor?

22 MR. TREVOR: You have indicated
23 a scope of Arctic Gas' work over a number of years in basic
24 research and so on. Can you tell me specifically whether
25 you have done any work on the question of an underwater
26 leak and the possible effect on the quality of the water?

1 MR. ROWE: Yes, we have done
2 some work on that. I believe that question earlier came
3 up about the toxicity of the -- a leak in the gas -- in the
4 pipeline towards fish.

5 Dr. McCart did a certain amount
6 of work on that and he might perhaps better explain that.
7 Incidentally, I might mention there are two components to
8 this. One would be a leak during the testing operation of
9 the pipeline and that would occur after construction when
10 you fill a line with water or if it's winter testing,
11 probably methanol and water and pressured up to a high
12 percentage of its yield -- a much higher percentage of its
13 yield strength than the actual operating conditions would
14 be.

15 During that time, it's effectively
16 a proof test of the system, whereby the pipe is at a high
17 stress level and you can detect leaks by virtue of the fact
18 that it's water which is an incompressible fluid. Therefore,
19 if there is a leak in the fuel, you can detect it very
20 shortly. If such a leak would occur in a river crossing,
21 then there would be the potential of having methanol water
22 solution where you're using methanol, leak into the aquatic
23 system. So you have that possibility as well as a leak which
24 might occur during the operating phase, whereby you would
25 have natural gas being discharged into the stream.

26 Perhaps Dr. McCart might address

1 those two conditions.

2 MR. TREVOR: Thank you. I'm
3 interested in the operating phase, please.

4 MR. ROWE: Fine, yes.

5 DR. McCART: You're interested
6 in the gas problem. We have not done studies with the gas,
7 however, in excess of ninety-five per cent of the gas is
8 methane and there have been studies in the past which in-
9 dicate that methane in itself, has an extremely low toxicity.

10 The other components are other
11 short chain gases of one kind or another, and a review of
12 the literature which we carried out, indicates that few of
13 these gases have been tested, but those that have been tested
14 are all relatively low in toxicity.

15 Natural gas itself, there has been
16 some study of the toxicity of natural gas in small leaks in
17 the vicinity of gas wells and things of this nature and it
18 is slightly toxic to plants. As far as the problem of a
19 gas leak underwater, as I see it, the difficulty will --
20 there will only be difficulty if the leak occurs during the
21 winter under ice. I don't see the problem -- any serious
22 problem with the toxicity of the material. If a problem
23 occurs at all, I think it will be because these relatively
24 simple compounds are broken down very readily by bacteria
25 and in this process, oxygen is used up, so if there is
26 natural gas trapped under ice and this is degraded during

Dr. McCart
Mr. D. Rowe

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1 the course of the winter, there may be a reduction in the
2 amount of oxygen and this could in fact, affect fish and
3 other animals of this sort.

4 I should point out though, that
5 my understanding in discussions with the engineers, is if
6 a pipeline of this nature at very high pressures, does leak,
7 it will generally blow. Under those conditions, the likeli-
8 hood that any blow-up with considerable force and the likeli-
9 hood that there will be much entrapment under the ice, is
10 rather limited.

11 Again, toxicity, I don't see as
12 a problem. If any problem does arise, it will be through
13 reduction in oxygen concentration.

14 MR. ROWE: I think after that,
15 perhaps the possibility of having a leak under a river, is
16 made more remote by the fact that generally, the rivers are
17 a type 'B' construction which means a heavier wall thickness
18 than the mainline pipe and as well, they are pretested
19 generally again speaking, before they are installed, pre-
20 tested on the bank, they're welded up and tested before they
21 are put into the river. So in effect, you would be able to
22 quite likely spot any weaknesses in that pipe prior to
23 installation.

24 MR. CARTER: Comments and
25 questions from the floor please?

26 MR. CARTER: Mr. Hill, we're in

1 much the similar position to you, since we just received
2 the document this morning and you did, so we'd appreciate
3 an opportunity this afternoon to ask some questions when
4 we've had a chance to peruse it a bit, if that's at all
5 possible.

6 MR. CHAIRMAN: Okay, we'll decide
7 that before we break for lunch. Any other comments, questions
8 from the floor?

9 We'll take a couple minutes break
10 and we'll decide this particular procedure of carrying on
11 this particular examination after people have had a chance
12 to read the brief.

13 (PROCEEDINGS ADJOURNED).
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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 MR. CHAIRMAN: Could we please
3 reconvene.

4 We will hear the Yukon Outfitter's
5 Association brief by Mr. Ostashek, and at one-thirty we will
6 come back to the, if in fact the discussion on the Outfitter's
7 brief is completed, we will come back to the Arctic Gas brief
8 when we reconvene at one thirty.

9 MR. OSTASHEK: Mr. Chairman,
10 members of the Panel, ladies and gentlemen, I am John
11 Ostashek, and I'm presenting this brief on behalf of the
12 Yukon Outfitter's Association.

13 Whereas this brief will deal
14 both within environmental and social and economical aspects
15 of the Foothills (Yukon) proposal, copies of this brief are
16 being submitted to this Inquiry, as well as to the Lysyk
17 Inquiry.

18 This brief is designed to state
19 the position of the Yukon Outfitter's Association in respect
20 to the Alcan or Alaska Highway Pipeline proposal.

21 First of all, let me familiarize
22 the panel with the outfitting industry and the Yukon Outfitter's
23 Association.

24 The Yukon Outfitter's Association
25 is an organization that is registered in accordance with the
26 Societies Ordinance of the Yukon Territory. This Association

1 represents every licensed outfitter in the Yukon. The
2 outfitting industry contributed approximately 2.5 million
3 dollars to the Yukon's economy in 1976. This accounted for
4 almost ten per cent of the total tourist dollars spent in
5 the Yukon last year.

6 While this may seem like a small
7 and insignificant sum in relation to the amount of revenue
8 that will be generated by the Alcan Pipeline proposal, it
9 must be remembered that the wildlife and the harvesting of
10 this wildlife is the only renewable resource that the Yukon
11 has at this time.

12 Properly managed, it will continue
13 to flourish and contribute to the Yukon's economy indefinitely.
14 The outfitting industry is economically stable at this time.
15 It does not receive or require any government subsidies to
16 continue to prosper. The people who are employed in this
17 industry are mainly Yukon residents of both native and white
18 origins. These people for the most part would be classified
19 as unskilled workers in other trades. Their employment with
20 the outfitters for a large number of them, is their only
21 source of income for the entire year.

22 While this Association would
23 prefer that no pipeline be built in the North at this time,
24 as any development that is going to provide more access to
25 wilderness and bring in a large influx of people in to the
26 Yukon is not to the best interests of the outfitting industry.

1 But, if a pipeline must be constructed, then the logical
2 proposal is the Alaska Highway proposal.

3 We take a strong position that if
4 the pipeline is to be constructed, that it should be done so
5 it has the least possible damage to the environment and the
6 wildlife of the Territory. It is our recommendation that no
7 construction should take place until all environment and
8 wildlife studies have been completed, assessed, and implemented,
9 to ensure the protection of our environment and wildlife.

10 We strongly oppose Foothills
11 proposal to route the pipeline along Section 5, Milepost 216.4,
12 and Milepost 321.4, and the construction of compressor
13 station FY #4 at Milepost 260.8. If this section of the
14 pipeline is allowed to be constructed along the proposed
15 route, it will cause serious and irreparable damage to
16 some of the Yukon's prime wildlife, namely the Dall Sheep in
17 the Ibex River area, grizzly, moose and caribou in the Squanga
18 Lake area. The wildlife in these areas are under extremely
19 heavy pressure now as a result of their close proximity to
20 the City of Whitehorse.

21 The proposed route would pass
22 through some of the Dall Sheep's winter range and lambing
23 grounds. We propose that if this route is allowed to stand
24 and construction go ahead, it will mark the end of the Dall
25 Sheep in the Ibex River range and surrounding areas.

26 The routing on Section 5 of the

1 proposed pipeline has virtually placed it right in the centre
2 of big game outfitting area number seventeen and close
3 proximity to the base camps of one outfitter.

4 No doubt Foothills will argue
5 that they are only using a small strip of land, but by routing
6 the pipeline along the proposed route and the construction of
7 compressor station number FY 4 will provide access for many
8 people in to this area and will virtually put this outfitter
9 out of business and have a serious and detrimental effect
10 on at least one other outfitter.

11 As we stated earlier in this
12 brief, we strongly oppose the route of the pipeline through
13 the Ibex River and Squanga Lake area, and also the site
14 selected for the construction of compressor station FY number
15 4.

16 We recommend to this Inquiry
17 that the pipeline should be re-routed along Section 5 to
18 follow the Alaska Highway, and to stay within close proximity
19 to the highway along the entire route of the pipeline through
20 the Yukon.

21 This Association feels that it
22 is imperative during construction the persons or companies
23 who have leases through which the pipeline will be
24 constructed be notified well in advance the day the
25 construction will take place through the said leases and
26 arrangements be made to provide access to the people during

1 the period of construction.

2 We would like to see the right-of-
3 way seeded with tame grasses after construction is completed
4 and people who have livestock in the area be given rights to
5 cut hay in sections of the right-of-way.

6 This Association takes the
7 position that in the event the pipeline construction would
8 deprive any person or company from carrying on their business
9 in the usual manner, that they be fully compensated for any
10 inconvenience, loss of revenue, or loss of livelihood due to
11 construction of the pipeline.

12 Thank you.

13 MR. CHAIRMAN: Thank you.

14 Are there any questions from the
15 panel? Mr. Wykes?

16 MR. WYKES: Just one point of
17 clarification. You indicated that the people who were
18 employed in the industry, the outfitting industry, are mainly
19 Yukon residents. Do you have a breakdown of Yukon residents
20 versus people from Outside?

21 MR. OSTASHEK: I don't have at
22 the present time, but I believe the last breakdown that was
23 taken was approximately 75 per cent Yukon residents.

24 MR. CHAIRMAN: Mr. Hughes?

25 MR. HUGHES: I realize that you
26 probably prepared your brief prior to the decision to expand

1 the terms of reference of this panel, but do you -- does your
2 Association have now, or would you be in a position to have
3 by the time of our July 5th hearing, some expression of
4 opinion on some of these alternate routes that are being
5 looked at. All of those involve, especially the Dempster
6 route and the possible Tintina Valley route, also involve
7 big game outfitting areas, and would you have -- do you
8 intend to make reference to those?

9 MR. OSTASHEK: We had not intended
10 to make reference to them as we were dealing with the Alaska
11 Highway proposal. We realize now that the terms of reference
12 are dealing with the other ones, but no doubt maybe this
13 panel isn't aware of it, but the Yukon Outfitter's Association
14 does not have the resources, nor the resource people to make
15 an in-depth assessment. We can only state what we know from
16 being in the areas and the impact that we feel the pipeline
17 will have on these areas. We no doubt could present a brief
18 similar to this one on the Dempster Highway proposal and
19 also the Tintina Trench proposal if the panel so desired.

20 MR. HUGHES: Well, I think under
21 the expanded guidelines, that would be useful to the panel.
22 Thank you.

23 MR. CHAIRMAN: Mr. Trevor?

24 MR. TREVOR: Just a point of
25 clarification. You were referring to persons or companies
26 holding leases through which the pipeline might pass. Was

1 there any particular form of lease which you were referring
2 to, or were you just talking about all land leases in general?

3 MR.OSTASHEK: We were talking
4 about land leases in general, but the pipeline will be going
5 through several grazing leases of different outfitters that
6 I am aware of at this time, and possibly,other people who
7 are not outfitters that have grazing leases.

8 This is the place where we were
9 making reference to the seeding of tame grasses also was in
10 the vicinity of places where livestock -- where there are
11 livestock in the Yukon. We did not intend it to mean along
12 the entire route of the pipeline.

13 MR. TREVOR: So, you would like
14 to see this in areas which are close to the outfitter's
15 operational areas in terms of making the hay available, or
16 just close to the communities?

17 MR. OSTASHEK: Well close to the
18 areas where there is livestock down.

19 MR. CHAIRMAN: Any comments or
20 questions from the floor please?

21 Mr. Bouckhout?

22 MR. BOUCKHOUT: Just one
23 question for clarification, Mr. Ostashek. I was under the
24 understanding that there was already existing access in to
25 the Ibex area -- in the Ibex Valley through some roadways.
26 Am I correct in that, or am I not correct?

1 MR. OSTASHEK: There is some
2 access to the Ibex Valley now, but with the site selection
3 for their compressor station, it will provide more access
4 right in to the range where the sheep are.

5 There is, as we said, the sheep
6 in this area, and the game in the Squanga Lake area are
7 under extremely heavy pressure now, without further
8 development in these areas.

9 MR. BOUCKHOUT: In that respect
10 you are aware of the location of compressor station at the
11 south end of the Ibex, on the saddle? In that respect,
12 would the possibility of limitation of access to that
13 station resolve some of the difficulties in that the access
14 road to that station would simply go from the area of
15 Franklin and Louise Lakes and so on, just to that station so
16 in terms of the possibility of limiting access on that access
17 road to the compressor station, would that resolve the kind
18 of thing you were concerned about with respect to that
19 compressor station and access to it?

20 MR. OSTASHEK: By limiting access,
21 do you mean that the road will be closed to the travelling
22 public?

23 MR. BOUCKHOUT: That would be
24 one possibility here. You are aware of course, that the
25 compressor station is not manned permanently. There is no
26 one permanently stationed on any of the compressor stations,

1 so the possibility would be that for maintenance and so on
2 there could be -- I'm simply throwing it out as a possibility
3 that there could be restriction of access on that short spur
4 to the station?

5 MR. OSTASHEK: Well, there's
6 always possibilities, but the pipeline in itself, and I
7 believe it is a two hundred foot right-of-way, is access
8 in itself without a gravel road or any access site to the
9 compressor station.

10 MR. BOUCKHOUT: Am I allowed to
11 get some clarification on that point, Dr. Hill?

12 MR. CHAIRMAN: Yes.

13 MR. BOUCKHOUT: In that respect,
14 just a couple of points, Mr. Ostashek, firstly the right-of-
15 way is much narrower than that, and secondly, we have no
16 intent to build any kind of access roads along the pipeline.
17 The only access that we intend would be permanent access to
18 the compressor stations. There would be no intent to provide
19 permanent access along the right-of-way itself, and our own
20 access for maintenance along the right-of-way would generally
21 be from L.G.P. vehicles and so on.

22 MR. CHAIRMAN: Any other comments
23 or questions from the floor?

24 Would you like to make any
25 points in summing up?

26 MR. OSTASHEK: No, I believe I

1 have stated the position of the outfitter's for the time
2 being. Thank you.

3 MR. CHAIRMAN: Thank you very
4 much. Is Mr. Heynen here of the Kusawa Outfitters? Would
5 you like to give us your brief please?

6 MR. HEYENEN: Some of the people
7 sitting on this panel do not know me, I will introduce
8 myself: my name is Klaas Heynan; I am married and have five
9 sons, and my home is in Whitehorse and I am a businessman
10 here.

11 I am here to tell you how the
12 Foothills Alaska Highway gas pipeline will affect me. My
13 business is outfitting. That means I guide big game hunters,
14 photographers and others interested in watching or hunting
15 big game. My registered guiding area is southwest and
16 northeast of the City of Whitehorse. It is in my guiding
17 area that the Foothills gas pipeline is proposed to leave
18 the Alaska Highway and run for miles across country through
19 prime wildlife habitat.

20 There are two main areas of
21 divergence that make me angry. The first is the Ibex River
22 area. Foothills would push their pipeline up the Ibex River
23 valley, over the top of Haeckel Hill, plant a noisy
24 compressor station there and punch in a permanent access
25 road. I'll tell you a bit about the Ibex River area.

26 The river cuts through a block

1 of sheep range which is continuous from Haeckel Hill and the
2 mountain on the north side of Ibex River, south on to Mt.
3 Ingram, Mt. Arkell and Mt. Ibex. Last year there were from
4 four to six hundred sheep on this range. Some of these
5 sheep lamb and have their summer range on Mt. Ingram and
6 on the north side of the Ibex River. I could take you in a
7 helicopter right now and show you as many as two hundred
8 sheep on Mt. Ingram. That is the kind of productive sheep
9 habitat Foothills intends to open up to motorized traffic.

10 The second area of concern to me
11 is that portion of pipeline from about McClintock River to
12 Squanga Lake, some of it eight or nine miles north of the
13 Alaska Highway. I'll tell you a bit about this area as
14 well. The Squanga Lake depression funnels woodland caribou
15 from the Snafu-Tarfu Lakes south of the Alaska Highway,
16 through to Judas Creek and the McClintock Range. This
17 whole area is extremely important to woodland caribou in
18 the winter, which is when construction will have to take
19 place because of the wetness of the ground there. This is
20 also an important moose wintering area, and the best grizzly
21 bear habitat in my guiding area; it also contains many
22 wolf denning sites. Here, too, Foothills plans to install
23 a loud compressor station with a permanent access road.
24 The combined effect of the noise and the traffic of 4 x 4's
25 on the road will be the disappearance of wildlife from this
26 area.

1 I have been told that Foothills
2 is curring across country to save four and a half million
3 dollars. And I know what Foothills will do after they hear
4 me here: they will send a junior executive around to see me
5 and he will say, "Mr. Heynen, we're sorry our pipeline is
6 disrupting your guiding area. Here's two hundred thousand
7 dollars for any inconvenience."

8 Well, Mr. Chairman, Foothills
9 will find out that it's not as simple as that. I could
10 describe for the Foothills people the pleasure I derive from
11 lying on my belly up on Mt. Ingram, watching through my
12 binoculars a young Dall lamb rearing up and bunting his
13 mother, then sprawling over backwards only to get up and
14 repeat the process. I could describe the smells and sounds
15 and feelings that surround me on a hunting trip. I could
16 describe the changes that take place in a city-bred man in
17 the course of a two-week hunting trip in undisturbed
18 wilderness. But that would be lost on the Foothills people,
19 so I will put it in 'to terms both of us understand - money.

20 A price can be placed on
21 anything: a day's work, on experience, a sunset, a sheep
22 population. To stay long the highway would cost Foothills
23 (or their customers) four and a half million dollars more.
24 Okay, then; to cut through the sheep, caribou and grizzly
25 habitat in my area will cost fourteen million dollars. How
26 do I arrive at that figure? I haven't the time to go into

1 lengthy details, but here are some of the factors involved.

2 First of all, a pipeline routed
3 through my area will put me out of business. That business
4 has a measurable value. This is a loss that affects me
5 immediately. Two of my sons have shown an interest in the
6 outfitting business; the oldest has guided for me a couple of
7 years now. That pipeline puts them out of business and it
8 affects their future incomes. I would affect the incomes of
9 up to twelve Indians who I've employed for the last eleven
10 years as guides and wranglers. It would affect the businesses
11 with which I deal. The pipeline through my area initiates
12 an adverse chain reaction that only begins with me, the
13 outfitter.

14 Outfitting is not a one-shot
15 venture like a gas pipeline project. An outfitting business
16 depends on the careful management of a renewable resource -
17 wildlife. Those sheep, caribou and grizzly, properly managed
18 can go on supporting people for the next hundred years and
19 longer. That pipe, that piece of steel, is by itself a harm-
20 less thing. The noisy compressor stations, the permanent
21 access roads and the cleared right-of-way are the problems.
22 One month to five years after that pipeline goes into my
23 area, there won't be any sheep left in the Ibex or caribou
24 or grizzly left in the Squanga Lake areas. They'll move away.
25 I have seen it happen before. Open up an area in this manner
26 and the disturbance of industrial noise and people will force

1 out the wildlife.

2 When the Yukon Territorial
3 Government wanted to build their new administration building,
4 they bought up the property on which the building now sits.
5 A motel owner I know held out for some time, not wanting to
6 move. Finally, he too sold and moved. A motel, after all
7 can be built on 4th Avenue and do as well as one on 2nd
8 Avenue.

9 But in my case and in the case
10 of wildlife it is a different matter. I have guided clients
11 from all over the world and mainly they come to the Yukon
12 for the Dall sheep. The Yukon Territory has the best Dall
13 sheep habitat there is and Foothills is going right through
14 a big piece of it. Dall sheep habitat isn't found in Africa
15 and it isn't found on 4th Avenue. It's a limited commodity.
16 Foothills knows that, but their attitude is: to hell with
17 the Dall sheep. I say; to hell with Foothills. Dall sheep
18 and their habitat cannot be moved. So, let Foothills move
19 their damn pipeline.

20 Mr. Trudeau, down there in
21 Ottawa, doesn't give a tinker's damn about those who live in
22 the Yukon, but he does care about moving gas through here to
23 the South. My heart bleeds for those people down there. If
24 they need Alaskan gas to heat their homes, I can sympathize.
25 If there's gas up there and they need it moved south, by all
26 means build a gas pipeline to move it. But don't build it

1 eight miles from the Alaska Highway through my guiding area.

2 If I were to ask you, Mr. Chairman
3 or the Foothills president as an individual, to give me out
4 of your own pocket five hundred dollars for no good reason,
5 just as an outright gift, you'd say 'no', would you not?
6 Well, I'm saying 'no' as loud as I'm able to Foothills. 'No',
7 you may not build a pipeline through my area; 'no' to their gas
8 customers (because that's who will be paying for any cost
9 overruns); 'no', I won't give you five million or ten million
10 or fourteen million dollars - dollars that will accrue to me,
11 to my children who will follow me in my business, to their
12 children and to all who benefit from my business. Keep
13 your pipeline along the highway. Keep it away from the
14 wildlife habitat on which my business depends.

15 Mr. Chairman, I have raised
16 five boys. When they refused to do what they were asked,
17 my philosophy was to offer them an alternative. For instance,
18 if one didn't want to do the dishes, I would let him choose
19 to vacuum-clean the whole house. Invariably, he would choose
20 to do the dishes. I have lived in the Yukon since 1953 and
21 in that time I have met many people. These Foothills people
22 strike me as being much like undisciplined children, intent
23 on having their own way, regardless of the consequences to
24 anyone else. I am offering them an alternative - keep the
25 steel pipe along the highway at a cost of 4.5 million dollars.
26 The alternative is this: come through my area with it's

1 irreplaceable big game animals and their habitat, but the
2 price is fourteen million dollars.

3 If that seems exorbitant,
4 consider that about one hundred people will be directly
5 affected if Foothills puts me out of business. One hundred
6 people. It is common these days for law suits for personal
7 losses to run into several millions. In that light, fourteen
8 million dollars when one hundred people are involved, is a
9 small figure. It is however, three times greater than four
10 and a half million. Foothills' choice should be obvious.

11 In case my presentation, Mr.
12 Chairman, sounds selfish as a sheep hunter and outfitter,
13 let me speak also on behalf of all local resident sheep
14 hunters. In '76 there were 816 Yukon residents who bought
15 sheep tags. The majority of those no doubt live in Whitehorse.
16 Their nearest sheep hunting is in my guiding area. These
17 816 hunters would have to travel much greater distances to
18 see or to hunt sheep. Right now, sheep are within the City
19 limits of Whitehorse. If the pipeline goes through the Ibex,
20 that will all be gone.

21 I realize my submission is of
22 an economic nature, with environmental overtones. For that
23 reason, I have chosen to present it to both the environmental
24 and socio-economic panels. I do not come to you with my hat
25 in my hand, asking for a handout from Foothills. I simply
26 want to be left alone. I have worked and fought for everything

1 I own or have accomplished. Now I want this panel to
2 recommend, since that's all you can do, that the Alaska
3 Highway gas pipeline stay close to the Alaska Highway.
4 There is no earthly reason why Foothills must destroy sheep,
5 caribou and grizzly habitats, and my business along with
6 them, when they have the option of staying out of it.

7 My accountant has an interesting
8 stamp that he uses on long overdue accounts. In the interest
9 of good taste, I cannot repeat the first two words his stamp
10 prints, but the next line reads: "Stronger letter will
11 follow." That sums up my feelings.

12 Klaas Heynen.

13 MR. CHAIRMAN: Thank you. Are
14 there questions of clarification from the panel?

15 Mr. Trevor?

16 MR. TREVOR: I wonder if I could
17 ask one or two questions on the figures that you have given
18 in your presentation. You refer to 816 Yukon residents getting
19 sheep tags. What proportion of those would actually achieve
20 their objective?

21 MR. HEYNEN: That I could not
22 answer, sir, that's the Game Department that has all these
23 records. It was just a fact that they had sold 816 licenses
24 and I have no idea how many people would shoot a sheep.

25 MR. TREVOR: Right. In your
26 own experience, how many other licenses then would be issued

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1 to non-Yukon residents?

2 MR. HEYNEN: That again, that's
3 a figure that's up to the Game Department, I have no record
4 of that at all.

5 MR. TREVOR: All I was trying
6 to do is relate this to the figures that you were giving
7 about the number of sheep that inhabit the areas you are
8 talking about.

9 MR. HEYNEN: I believe, sir,
10 that John Ostashek might have some figures on that.

11 MR. OSTASHEK: As far as the
12 non-resident hunters in the Yukon last year, there was
13 338 non-resident hunters in the entire Yukon.

14 Out of the 338 there was 275
15 sheep tags sold to non-residents, and 264 grizzly bear tags.
16 There was 816 sheep tags sold in 1976 and there was 3,359
17 moose tags sold, (these are resident tags I'm talking about)
18 1,644 resident tags for caribou, 132 goat tags for residents,
19 380 grizzly bear tags for residents, and 734 black bear tags
20 for residents.

21 Are those the figures that you
22 wanted, sir?

23 MR. TREVOR: No, I was just
24 interested in the Whitehorse area, and the number of sheep
25 tags that were issued related to the possible number of sheep
26 that inhabited in the area. It seemed to me that the numbers

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Mr. Chambers
Mr. L. Bouckhout
Mr. C. Wykes

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1 were getting fairly close together and therefore the -- it
2 didn't seem possible for the area to support that kind of
3 big game hunting.

4 MR. OSTASHEK: Well the tags sold
5 are for the entire Yukon, sir, but as we all realize, the
6 bulk of the hunters are out of Whitehorse and I believe the
7 Game Branch has the figures broken down that the area within
8 fifty miles of the City of Whitehorse, absorbs 95 per cent
9 of the resident hunters.

10 MR. TREVOR: Thank you.

11 MR. CHAIRMAN: Mr. Chambers?

12 MR. CHAMBERS: I have a question
13 maybe that Mr. Bouckhout could clarify for me. You made a
14 statement in your Squanga Lake area that a compressor
15 station with permanent access. Mr. Bouckhout would you clarify
16 is that still the intent?

17 MR. BOUCKHOUT: That compressor
18 station, Mr. Chambers and Mr. Heynen, is no longer there.
19 There's neither a compressor station nor an access road
20 proposed in the Squanga Lake area at all, and additionally,
21 the entire Squanga Lake area is proposed for summer
22 construction rather than winter construction, so those are
23 two points relevant to clarification in that area.

24 MR. CHAMBERS: Thank you.

25 MR. CHAIRMAN: Mr. Wykes?

26 MR. WYKES: Mr. Heynen, I wonder

1 if you could tell us the use made of the area by hunters that
2 are not accompanied by an outfitter in the proximity of
3 Whitehorse?

4 MR. HEYNEN: Well, the Ibex
5 area is mainly used by local hunters. They are not hunting
6 with an outfitter, so the 816 sheep tags that were issued
7 by the government are, a great portion as Mr. Ostshek said,
8 95 per cent of them hunt that particular range, because
9 that's the only accessible range for local residents where
10 they can get in without the use of horses or airplanes,
11 or -- so it's a prime area for local hunters, real prime
12 area for local hunters.

13 MR. CHAIRMAN: Okay, we'll open
14 up the meeting the questions and comments from the floor,
15 please?

16 It would appear that if the
17 contention is that if a pipeline is built through this area,
18 that inevitably the game would disappear, and it would
19 appear it is the panels job to try to hear the people's
20 opinions on whether or not that would in fact happen.
21 Could you -- you mention that you had seen it happen before.
22 I suppose it's not for pipelines, per se, but could you
23 document exactly, or as well as possible when Dall sheep
24 moved out of an area because of people's activities, such as
25 building pipelines?

26 MR. HEYNEN: Well certain -- a

1 number of years ago, there was a heavy activity in the Mud
2 Lake area, and the mining corporations came in with helicopters
3 and deposited their drums and cabins and tent frames and
4 mattresses and this was right in the heart of our sheep area
5 and moose area, and we have just since then broken up camp
6 because there's nothing left to look at. The sheep just does
7 not stay where people are, and that area is completely clear
8 of sheep for the last five years.

9 Then two years ago, we had another
10 rush on staking and some mining company came in the Ingram
11 range and the sheep had moved completely off this mountain
12 range, and it took approximately three years before they
13 even came back on that range, and it was simply a matter of
14 helicopters moving up and down the valleys and buzzing, and
15 the crew putting stakes in the ground where proposed mining
16 claims should go.

17 Now, there's going to be a
18 permanent access road, which is a pipeline that's buried, you
19 must patrol it either by helicopter, or grass grows over top
20 and four wheel drives will follow in on that road, and
21 thereby just opening up this total area. This is the big
22 thing, and as soon as you have, -- you can look at Carcross
23 where you move in a railroad track or something that makes
24 noise, the animal moves and does not come back. There's
25 no reason for it.

26 The same thing happens with caribou

1 that has moved and does not return. We can't answer why it
2 is, it's just that when industry moves in, the animal
3 moves out.

4 MR. TREVOR: Yes, I happened to
5 be along the road and saw the sheep on Sheep Mountain near
6 Kluane National Park, and those sheep seem to have become
7 accustomed to the traffic along the highway. Is this a
8 usual type of thing that some sheep do become accustomed
9 to the activity.

10 MR. HEYNEN: Well, if you make
11 a main road right through it, and in due course, I imagine
12 these sheep moved down when the Alaska Highway was put in,
13 and then years and years later, they might move back. But
14 this is in a park area, and it's also no hunters have access
15 to shoot in that area, I believe.

16 So, if you open up an area in
17 the Ibex, unless you make a park out of it, I don't think
18 they will ever come back.

19 MR. CHAIRMAN: We have a comment
20 from the floor.

21 MR. OSTASHEK: Mr. Chairman, I
22 would just like to elaborate on Mr. Heynen's statement there
23 and your question in regards to the sheep on Sheep Mountain.
24 As Mr. Heynan has already pointed out to you, Sheep Mountain
25 is in a national park and a game preserve and the sheep in
26 there are protected. Any time you provide access to an area

1 and there's hunters in the area, people travelling in the
2 area, the game tend to move out in to other areas.

3 A good example of this is in the
4 area that I operate in, which is in the Kluane Lake area,
5 which has the Alaska Highway running through it, and the
6 Foothills Pipeline will be coming through it also. But in
7 that particular area, the highway is on the south side of
8 the valley, and so is the pipeline, the old Fairbanks pipeline
9 I'm talking about now, and there's also a game preserve on
10 that side of the highway.

11 If you go to north side of the
12 highway, which access of blocked off because of Kluane Lake
13 and the Kluane River, you will find the moose population,
14 they tend to be five times greater than what they are on
15 the south side of the valley where there is even a game
16 preserve to protect them. So there's no doubt, I don't think
17 in anybody's mind who is familiar with game that any time
18 you provide access to an area, it marks the end of the game
19 or very -- the numbers go down quite rapidly.

20 MR. CHAIRMAN: Any other questions
21 or comments from the floor?

22 Do you have any comments to sum
23 up? Okay, thanks very much.

24 We'll recess until one thirty and
25 we'll continue with questions of Arctic Gas at that time.

26 (PROCEEDINGS ADJOURNED)

1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2
3 MR. CHAIRMAN: Do
4 you wish to start without Mr. Rowe being present?
5 We're
6 prepared to start without him to expedite the proceedings.

7 MR. CHAIRMAN: Okay, we'll
8 being then, reconvene the meeting and we will now have
9 questions and comments from the floor on the brief that
10 was presented by Artic Gas. Are there any questions or
11 comments?

12 Mr. Bouckhout.

13 MR. BOUCKHOUT: I have just
14 a few comments to make regarding some of the points brought
15 up by Mr. Rowe this morning. These are as follows. Re-
16 garding study time required, Mr. Rowe indicated that he
17 felt, or had felt that two years were required to adequately
18 ly do the work necessary to install the pipeline. There is
19 in fact two years available for doing this. We are right
20 end of
21 now nearing the/first year of active participation in
22 field studies, with regards to our pipeline proposal. In-
23 formation from the project area and from civil construction
24 experience supplements the work we are doing. There is, of
25 course, quite a bit of experience relative to civil cons-
26 truction in the work we're proposing. For instance, the
Alaska Highway, the Haines/Fairbanks Products Line and so

1 on and so forth, and other civil construction projects.

2 There's a fair bit of infor-
3 mation that's been generated through other pipeline studies,
4 which is also applicable. Here I'm referring to various
5 studies and experience gains with respect to the Alyeska
6 Pipeline, with respect to other pipelines in the Mackenzie
7 Valley and the North Slope, which has been done over sev-
8 eral years and a great deal of this information is appli-
9 cable to a northern pipeline project, of which the Alaska
10 Highway Pipeline Project is one.

11 Experience on nearby, other
12 nearby pipeline systems is also relevant in many cases.
13 Here I'm referring primarily to the Westcoast Transmission
14 System, which is at the southern extremity of the proposed
15 route in Yukon. In fact, Westcoast has a pipeline which
16 crosses a small portion of the Northwest Territories and
17 the Yukon in its northern systems, joining into the north-
18 ern British Columbia system.

19 An additional thing that
20 should be, point that should be taken into account here as
21 well, is that this project is phased-in. In other words,
22 when we come to initial construction in 1979, we do not
23 construct the entire 500 miles all at once. In fact, only
24 200 miles is proposed to be constructed in 1979, and there-
25 fore, more than half of the system is yet to be constructed
26 after the beginning of 1980.

1 With regard to monitoring,
2 which is another point which was discussed briefly. The
3 kinds of biological studies now being done are directed to-
4 ward providing quantitative as well as qualitative sites
5 specific data. These are the kinds of data that are used
6 in monitoring programs and this data is therefore available
7 for any future monitoring programs.

8 With regards to Kluane Park,
9 we have held frequent discussions with Park personnel since
10 the project was conceived in 1976 and will continue to do
11 so. Additionally, we are carrying out pipeline related
12 research in the Kluane Park area in the range of our right-
13 of-way in that area.

14 We do not intend, at the
15 moment, to carry out any research in terms of long-term re-
16 search in Sheep Mountain, since a great deal of research
17 has been done on Sheep Mountain and the sheep population
18 there. This includes PhD. thesis, for instance, which have
19 been produced as a result of study of sheep on Sheep Mount-
20 ain and therefore we don't feel that a great deal more re-
21 search is applicable in that respect, aside from applying
22 the information to the pipeline project and the location of
23 the project.

24 A couple of comments regard-
25 ing revegetation. Foothills has, in fact, had Vaartnou
26 and Sons Enterprises under contract to produce northern na-

Mr. Bouckhout

1 tive seed and seeded naturalized land races since 1975.

2 We now have approximately 9,000 pounds available and expect
3 a harvest in the order of an additional 50,000 pounds this
4 fall.

5 I earlier discussed the two
6 test sites, which are being used to test seed viability
7 and adaptability, seeding times, suitability for erosion
8 control and so on. One test site being recently instituted
9 in the Haines Junction area, the second site having been in
10 operation for over a year now on pipeline systems in north-
11 eastern British Columbia.

12 With regard to the overall
13 environmental suitability of the Alaska Highway route, the
14 suitability, as we see it, is not based strictly on the
15 presence of a highway, which by its presence does provide
16 us with all-weather access, both during construction and,
17 potentially, during operation. I have mentioned already
18 the construction experience gained in the area relative
19 to civil construction projects such as the Alaska Highway
20 construction, the Haines/Fairbanks Line.

21 The nature of the terrain
22 along the route is such that it permits us to carry out
23 summer construction. In other words, the implications of
24 permafrost and so on, which are looked upon as part of the
25 environmental context, are such that it is not a very major
26 concern through most of the route. We do propose winter

1 construction for a portion of the route, where we feel
2 that would be advantageous with respect to terrain stabi-
3 lity and terrain disruption.

4 Our assessment of the pro-
5 ject has and will continue to be based on the implications
6 in view of the existing circumstance of the entire project
7 area and not viewed exclusive of the Alaska Highway, or
8 only based on the existence of the Alaska Highway.

9 One final comment that may
10 warrant a bit of clarification and this is regards to
11 methanol and the use of methanol. We do not intend to use
12 methanol for hydro-static testing. The entire pipeline in
13 Yukon would be tested with water. Water at ambient temper-
14 atures drawn from approved sources. We would not be using
15 a water methanol mix for hydro-static testing, in other
16 words. A great deal of the concern with other projects
17 relative to hydro-static testing in methanol has been in
18 regards to the use of methanol water solution, or a methanol
19 water mix for hydro-static testing. That is not proposed
20 in Yukon. We propose to use only water, not a water-me-
21 thanol mix.

22 Those, Dr. Hill and members
23 of the panel, are basically all the additional comments
24 I have now, which I felt might assist in clarifying or
25 identifying the concerns. We'll, of course, be prepared
26 to answer some of these various points raised, should you

1 deem it fit, when we come to the July hearings.

2 MR. CHAIRMAN: Thank you.
3 Would, are there any other comments? Comments from Artic
4 Gas?

5 MR. JAKIMCHUK: I just
6 have one, Mr. Chairman, and that is, if I understand Mr.
7 Bouckhout correctly and I'm prepared to stand corrected,
8 he has just asserted that Foothills/Alcan will be in a
9 position two years from now to ascertain whether the envi-
10 ronmental impact of their pipeline is acceptable or unac-
11 ceptable. Whereas the decision as to who builds the
12 pipeline where, as we all know, is coming down on Septem-
13 ber 1st. And, it seems to me that that, well, it causes
14 me some problems and I'd be prepared to be corrected.

15 MR. CHAIRMAN: It looks
16 like you're going to have a comment anyway.

17 MR. BOUCKHOUT: No, Mr.
18 Jakimchuk, that's not what I had hoped to intimate. I
19 believe the environmental feasibility of the route is
20 without serious question at this moment. What I did say,
21 what I meant, was that the studies which we are undertak-
22 ing are those studies which are necessary to provide the
23 details for the definitive protection measures, which will
24 be applied to the route, applied to the construction phase
25 and so on. And again, I mentioned that we're talking about
26 a phased-in project, we're talking about only the first

1 two construction spreads, summer construction spreads,
2 to be undertaken in the summer of 1979, which is approxi-
3 mately 200 miles.

4 MR. CHAIRMAN: Comments from the
5 floor, any comments from the floor on the Artic Gas brief?

6 Any questions from the panel mem-
7 bers?

8 MR. HUGHES: I have a couple of
9 questions. There seems to be a little confusion over the
10 proposed extension to Kluane National Park. Could you
11 tell us about this proposal and what stage its at?

12 MR. BOUCKHOUT: I think, probably
13 answering for all of us, I was not part of our own testi-
14 mony and it could, had better be answered by either Dr.
15 Gossen or Dr. Banfield. We have no particular specialized
16 knowledge of it.

17 MR. HUGHES: On page 4, you
18 mentioned introduced bands of bison, Takhini River. Are,
19 is there evidence that those bison still exist?

20 MR. JAKUMCHUK: I didn't write that
21 and I don't know a thing about the bison in the Takhini
22 River, so, I think the Foothills people who are responsible
23 for environmental studies on that route would be in a bet-
24 ter position to answer that.

25 MR. HUGHES: Okay then, maybe this
26 is in the same category. This definition of the Squanga

Mr. Hughes
Mr. Jakimchuk
Mr. D. Rowe

1 Lake diversion, this Alpine Tundra Habitat. I was wonder-
2 ing how that's defined? What the definition of Alpine
3 Tundra Habitat is, whether or not it's permafrost or...?

4 MR. JAKIMCHUK : Are you directing
5 that to me?

6 MR. CHAIRMAN: Well, whoever.

7 MR. JAKIMCHUK : I'd be prepared
8 to discuss the Alpine Tundra Habitat. It's analogous to
9 the Arctic tundra, similar associations of plants and
10 also wildlife species. I can't comment on the geo-techni-
11 cal because I don't have the background, except I think
12 it would be fair to say that it doesn't necessarily have
13 to have permafrost just because it's alpine tundra. It
14 exhibits - in terms of its importance and sensitivity, it
15 exhibits the same types of sensitivities as habitat as
16 tundra and perhaps accentuated a little further by
17 steep slopes and high winds at higher elevations. It is
18 a very sensitive type of terrain.

19 MR. CHAIRMAN: So, the statement is
20 "that summer construction over alpine tundra habitat can
21 be expected to cause significant terrain damage". Could
22 you elaborate on that statement? What would be the ter-
23 rain damage and is it associated with permafrost?

24 MR. ROWE : One of the problems
25 that we foresaw in that tundra would be slope stabiliza-
26 tion, which would be caused by the disruption of the vege-

1 tative covering during summer construction. This would
2 be different in the alpine tundra where your elevation
3 contours are more abrupt, perhaps then they would be say,
4 in the northern Yukon, along the coastal plain, where
5 your changes in elevation are fairly moderate.

6 MR. CHAIRMAN: I will read the brief
7 in more depth, but it seemed to me that there's a signifi-
8 cant portion of the brief dealt with the advantages and
9 the disadvantages of accepting a corridor concept and, on
10 first reading, in one spot, you're suggesting that 20 per
11 cent of the pipeline is straying from the corridor and
12 that there may be significant effects from that. And the
13 other part, you seemed to be arguing that the corridor
14 concept isn't necessarily the best one. Could you explain
15 the apparent difficulty I have here?

16 MR. ROWE: As I understand
17 the concept of this, evidence was put forward by Dr.
18 Banfield, who is the advocate of this particular thought
19 process, that he is making the suggestion that you cannot
20 inherently judge the corridor per se, that each one, in
21 each situation has to be judged on its own merits. That
22 you cannot say that because it is in a particular corri-
23 dor, it is better than if it were not or vice versa, just
24 applying that principle across the board. And I think
25 that is the main point that he wished to make here, is
26 that, for example, because the pipeline follows or paral-

1 lels the highway, the logic thing that there is a minimal
2 impact because of the existing disturbance, or, moreso,
3 you cannot make that assertion without some sort of data
4 to judge that particular individual situation.

5 MR. CHAIRMAN: But in this particular
6 case, the assertion seems to be made that it's when, when
7 the pipeline proposal strays from the Alaska Highway, that
8 the, that's where the sensitive areas appear to be. Is
9 that, is that the case, is this what you're saying?

10 MR. ROWE: I don't believe
11 they make that point in here, because we just don't have
12 the data to make an assessment on that.

13 MR. CHAIRMAN: Well, I'll read it
14 more carefully tonight.

15 MR. ROWE: Dr. Banfield
16 will be here in July and it was his concept that was, is
17 here.

18 MR. HUGHES: Okay.

19 MR. CHAIRMAN: Are there any other
20 questions from the panel or comments? They're all busily
21 reading here.

22 Do the panel staff have any com-
23 ments on the, questions on the brief?

24 Okay, Mr. Hughes would like to
25 make a, take a couple of questions.

26 DR. HUGHES: The panel staff have

1 submitted some requests for additional information to
2 Foothills Pipe Lines. One particular request dealt with
3 this, partly with this matter of what you can learn from
4 existing civil construction and that being the pipe, the
5 existing products line. As I recall, we asked for speci-
6 fic information about changes in the thermal regime along
7 the right-of-way. Could you tell us when you'll be able
8 to respond to that and other questions that were raised

9 MR. BOUCKHOUT: Yes, Dr. Hughes,
10 we have, in fact, responded to a couple of them, have
11 forwarded the various responses to the panel and panel
12 staff. The particular requests which you're referring
13 to, we have completed a response to it and hopefully it's
14 nearing Whitehorse now, with the rest of my baggage.
15 Unfortunately, my baggage didn't make it with my yester-
16 day. In fact, we do have that one prepared and ready
17 and we'll have it here as soon as it's in our hands.

18 In regards to the permafrost im-
19 plications and what has happened to the permafrost on
20 the Haines/Fairbanks Products Line, again I have a num-
21 ber of people here with me, and one in particular, who
22 would be prepared to discuss that now if you wanted to
23 discuss it briefly now. It's....

24 DR. HUGHES: Our chairman
25 indicates that we have some time for that, but I don't
26 think we wanted to get deeply into the technical aspects,

1 but I think it's important to, for us to know whether
2 this comes into this question of following existing
3 rights-of-way. Is there - we'd like to know whether any
4 thermal changes or changes in the hydro-logic or thermal
5 regime along that right-of-way makes it either more fa-
6 vourable or less favourable or otherwise, with respect
7 to location of your proposed line.

8 MR. ROWE: Yes, sir, well in
9 that respect then, I'll call on Fred Claridge, who is
10 one of our consultants with the Kohn Leonoff Consultants
11 Ltd., who has done some work in the area, who might be
12 able to give you a bit more information, at least on a
13 general level at this stage on that.

14 MR. CHAIRMAN: This is off the
15 topic a little bit from Artic Gas' brief, although it's
16 certainly within the corridor line of questioning. I
17 understand you have planes to catch. Would you like to
18 sum up now or after this line of questioning is finished?

19 MR. ROWE: I just have one or two
20 points, I have one point actually to make in summing-up
21 and perhaps I could do that now and then it would be out
22 of the road.

23 MR. CHAIRMAN: Okay, then, would
24 you please continue.

25 MR. ROWE: It was really a data
26 request that before the reconvening of the hearing in

1 July, we'd be very appreciative of receiving information
2 which pretains to any preliminary reports that Foothills may
3 have their summer's environmental work or any of the infor-
4 mation that they might be able to supply us in the nature of
5 the types of studies they're doing, the methodology, summaries
6 of the timing of the studies, where they'll be looking and
7 details of that nature. If we could have access to this be-
8 fore the next hearings, we might be better prepared to discuss
9 this.

10 MR. CHAIRMAN: Yes, I believe
11 we made this request. I don't, I'm not sure we got an answer
12 yet on that point, Mr. Bouckhout, on the timing of the studies
13 and when your studies are going to reach fruition, what will
14 be available before July.

15 You'll respond to us in writing?

16 MR. BOUCKHOUT: Yes, I can do.
17 I will do so.

18 MR. CHAIRMAN: Okay, and when
19 that happens, we'd be happy to make the information available
20 to you.

21 MR. BOUCKHOUT: Fine, could we
22 extend that to cover any of the government studies which are
23 in progress or planned, as well, either CWS or the Yukon Ter-
24 ritorial?

25 MR. CHAIRMAN: Okay, I think we've
26 asked the same question there. I'm not sure we have an answer

1 yet.

2 Okay, thank you very much.

3 MR. CHAIRMAN: Mr. Claridge.

4 MR. CLARIDGE: Yes, Dr. Hughes inquired
5 as to whether there was an obvious difference, as I interpret
6 your question, in the thermal regime, beneath the Haines
7 Products Line, as compared with the undisturbed ground adja-
8 cent. That was one of the questions that was probed in the
9 1976 Foothills' drilling program and the hypothesis, or one
10 of the hypotheses that was probed at that time was the possi-
11 bility that the right-of-way had thawed out to considerable
12 depth and that perhaps settlement that could occur upon
13 thaw-out had already occurred and would therefore, in a manner
14 of speaking, have prepared the right-of-way for construction.

15 There were, as I recall, something in
16 the order of half a dozen holes drilled in that right-of-way
17 and you can confirm that in the report that Mr. Bouckhout
18 referred to, but the conclusion was that very little melt-out
19 had occurred. Surprisingly little in the half dozen locations
20 that were drilled and the conclusion that we reached was that
21 a large impact had not occurred thermally.

22 Other areas, there is evidence of
23 some settlement, upwards of one to two feet that have occurred
24 and that would indicate a contrary conclusion in those areas
25 that there has been a warming and a melting of permafrost,
26 but we feel that those are isolated occurrences. They seem

1 to be associated with a greater disturbance of the ground
2 cover and that the general conclusion still holds, that the
3 right-of-way has not thawed out.

4 MR. CHAIRMAN: So that there's no
5 sort of general deep thawing that would indicate that you
6 could use that right-of-way for a warm pipeline without first
7 investigating the problems of thermal subsidence.

8 MR. CLARIDGE: That is correct and in
9 a general sense, the potential for thaw settlement would be
10 almost as great on the Haines Line as it would be on the
11 present route chosen by Foothills. That is not to exclude
12 the Haines right-of-way. In our opinion, geo-technically,
13 it, in portions, would be an acceptable route, but it would
14 not be preferred from the standpoint of having thawed out.
15 It does not appear to have done so.

16 MR. CHAIRMAN: And you also, have
17 you also been able to get from that pipeline route, some
18 feel for the problems of erosion, slope failure....

19 MR. CLARIDGE: Yes, it does provide
20 an indication of what types of problems might be encountered.
21 For example, in a slope, in slope stability, there was almost
22 no indication of slope failures due to disturbance of the
23 right-of-way. On the other hand, we did see indications of
24 erosion on extremely gentle slopes and this we attributed to
25 the presence of high concentrations of silt and the presence
26 of ice. So there were, really, two conclusions. One was that

1 slope stability did not appear to be a problem. I think
2 that's because the material is quite silty, that if it's
3 disturbed, the water can free itself from the silt without
4 developing excess pressures that can cause slope instability
5 for example, on the Mackenzie River, where you see large re-
6 trogressive slides. The material there is much finer and
7 is prone to developing excess pressures. Now that condition
8 does not seem to exist on the Haines right-of-way, or, for
9 that matter, on the Alaska Highway. By contrast, there is
10 the development of erosion on very flat slopes. I'm talking
11 about the northern 80 miles, where lake basin materials and
12 fine grain materials are present in widespread permafrost,
13 in combination with ice.

14 South of mile 80, relatively speaking,
15 the materials are coarse grained and free of excess ice and
16 slope stability is confined, really the problems are confined
17 to, confined to very steep slopes, such as on Tallish, as
18 you might get in northern British Columbia. In some of the
19 existing pipelines, that's the type of problem they most
20 normally deal with beyond steep side slopes and they're not
21 concerned about permafrost, to the degree that you would be
22 in the northern 80 miles.

23 It's a little difficult to generalize
24 because we're talking about 500 miles of pipeline and I look
25 at the northern 80 miles as being one type of problem, where
26 permafrost and fine-grained materials predominate and, south

1 of mile 80, there is relatively little permafrost, but you
2 get into much steeper topography and you get into more of
3 the type of problem you might in northern British Columbia,
4 not too much permafrost or that type of problem, but more
5 the problem, the route location, trying to avoid steep
6 slopes and having to do cuts, this type of situation.

7 You might wish to carry it on in a
8 particular context or location to go beyond what I have just
9 said.

10 MR. CHAIRMAN: No, that answers
11 my main question. Thank.

12 MR. CHAIRMAN: Maybe I could ask a
13 supplemental question. When you are considering the, your
14 hypothesis of ice degradation under the existing right-of-
15 way, did you determine how the right-of-way was cleared and
16 maintained? Was it cleared in the wintertime or in the
17 summertime, with heavy or small equipment? How much actual
18 disturbance was there to the surface at the time of clearing
19 of the right-of-way.

20 MR. CLARIDGE: Dr. Hill, some of that
21 information is available. We have, in fact, in response to
22 one of the data requests indicated where there is some infor-
23 mation on the original construction of the line available
24 relative to clearing and so on.

25 With respect to maintenance, it's my
26 understanding that the line was maintained by use of

1 defoliants.

2 MR. CHAIRMAN: Of defoliants.

3 MR. CLARIDGE: Just a general comment,
4 from having inspected portions of the line, I would say
5 that the precautions in grading and clearing were relatively
6 minor. I should imagine that a great deal of the line was
7 cleared in the winter in some of the wetter areas. I would
8 presume that to be the case. I haven't seen a definitive
9 answer to that. There may be one. I suspect other areas
10 further south, towards Haines, would have been cleared in
11 the summer. There are areas that evidently they did consid-
12 erable amount of surface damage and I think that's where
13 there is evidence now of some subsequents that I referred
14 to.

15 Other areas look quite good. I ex-
16 pect they would have been cleared in the winter and left the
17 organic matter more or less intact. I suspect it's a mixed
18 process of clearing.

19 MR. CHAIRMAN: Okay, no doubt we'll
20 get into that in a little more detail in July.

21 Are there any questions from the
22 panel? We've come to the end of the day's business, I be-
23 lieve, the scheduled data for today has been submitted.

24 Are there any particular questions
25 that the panel wishes to ask at this time of Foothills?

26 MR. WYKES : I was wondering what,

1 in terms of the hydro-static testing that whether or not Foot-
2 hills has identified locations for taking the water they plan-
3 ned to use, what type of contaminants might be added to the
4 water by putting the water through a pipe and then discharging
5 it and whether or not they've looked at locations for discharge
6 of the water after it's been put through the pipe, and, in par-
7 ticular, whether or not they're thinking of putting the water
8 back into the same place they got it?

9 MR. CLARIDGE: Yes, Mr. Wykes, with
10 respect to your initial question on water sources, no, we have
11 not identified particular water sources as yet. There will be
12 water requirements, of course, not only for hydro-static test-
13 ing, but also for camp utilization and so on. It is our intent
14 to survey inventory water-availability and so, with respect to
15 water utilization as the project proceeds farther into final
16 design.

17 Now, that inspection of available water
18 sources and determination of final sources for use will be de-
19 pendent on quantity estimates, on various environmental consider-
20 ations with respect to the quantity availability and the source,
21 the quality and the source and so on.

22 By the same token, we have not identified
23 particular discharge sites. You will appreciate, of course,
24 that in the pipeline planning, at this stage there is still some
25 flexibility in actual location. I mean site specific line
26 location itself.

1 The hydro-static testing procedures are,
2 to some degree, determined on local topography of the final
3 line and so on and therefore the precise lengths, hydro-static
4 testing lengths will be determined at a later stage in the
5 planning process.

6 We had not envisioned necessarily re-
7 placing the water that was used in hydro-static testing in the
8 source from which it was taken. The selection of the discharge
9 site, just as the selection of the source in the first place is
10 going to have to be assessed on the basis of local conditions
11 and what the potential implications are of discharging water in
12 that particular site.

13 In terms of what contaminants might be
14 found in the discharge to hydro-static testing water, as far as
15 I know the contaminants would primarily be inert. There would
16 be some materials found within the pipe, dirt, silts, glaze,
17 whatever, there may be some foreign substances found- welding
18 rods, this is a possibility, this kind of thing, but the pipe
19 is internally coated with an inert substance and therefore, as
20 I understand it, there should be no contaminant, no chemical
21 contaminant per se in the water used for hydro-static testing.

22 MR. CHAIRMAN: Okay, could I follow
23 up on that? I've got a little note on methanol. You say you're
24 not going to use a water/methanol mixture. Could you explain
25 why water and methanol is used, under what conditions, and why
26 it would be a proposal in this case and how you're not going to

1 use methanol?

2 MR. CLARIDGE: The initiation, Dr. Hill,
3 of the water and methanol mixture for use in hydro-static test-
4 ing was primarily based on winter-testing in permafrost areas,
5 where there is significant amounts of permafrost and very low
6 temperatures.

7 In terms of the pipeline route in Yukon,
8 which we're dealing with, the hydro-static testing will primari-
9 ly be done in the spring season and the occurrence of permafrost
10 along the line is such that it should present us with no diffi-
11 culty whatever in utilizing straight water at ambient tempera-
12 ture of hydro-static testing, as opposed to having to use a
13 freeze depressant. When you do hydro-static testing you put
14 the water in the pipe and bring the pipe up to a particular
15 test pressure and maintain that pressure over a 24 hour period.
16 Therefore, there is a phase in the hydro-static process, hydro-
17 static testing process where the water is maintained without
18 circulation in the pipe and it's during that phase that in,
19 particularly in continuous permafrost areas and so on, where
20 you're dealing with winter hydro-static testing, there's some
21 concern that the water will freeze in fact in the pipe. That's
22 why, as I understand it, the original hydro-static testing
23 method, which is the one currently espoused by Artic Gas on
24 their route, was determined in order to freeze depressant. So
25 this problem would not occur.

26 MR. CHAIRMAN: It would, you're going to

1 construct, though, a certain number of miles - is it a hundred
2 miles - in the wintertime, the first hundred miles....

3 MR. CLARIDGE: That's right.

4 MR. CHAIRMAN: ...which a large percent-
5 age is permafrost.

6 MR. CLARIDGE: That's correct.

7 MR. CHAIRMAN: ...But you're, as I under-
8 stand it, you're, you plan to do the hydro-testing in, hydro-
9 static testing in the spring, after the pipe's in the ground?
10 And, presumeably, the temperature below the ground wouldn't
11 vary that much, a seven or fifteen foot down from the winter
12 or the summer. I don't quite see how you avoid the problem
13 of water freezing in the pipe?

14 MR. CLARIDGE: Well, as I understand it,
15 what, and we can address this more fully, certainly, when we
16 have the people who are more familiar with it, as I understand
17 it, the area that we're constructing in the wintertime is being
18 constructed then, not only because of the existence of perma-
19 frost which is in the discontinuance permafrost zone where
20 there appears to be more permafrost than the rest of the line,
21 but also because of the nature of the terrain in that it's
22 quite a muskegy area, therefore it's subject to considerable
23 surface disturbance if there were a great deal of activity in
24 the summertime in that particular area.

25 So, it's not strictly because of the
26 implication of permafrost.

1 Additionally, with respect to the test-
2 ing and the water circulation and so on, the assessment of the
3 people who have designed the hydro-static testing procedures
4 is such that no freeze depressants in this particular area are
5 required.

6 I'm sorry, I can't go into the techni-
7 cal details of it because I'm not aware of the technical de-
8 tails.

9 MR. CHAIRMAN: We'll get into it later,
10 but if you assume that the hydro-static testing is going to be
11 done in the spring, I'd be interested to know what happens then
12 in the case of the lengths of pipe where the hydro-static tests,
13 the pipe does not withstand the hydro-static tests, the actual
14 fixing of the pipeline and so on, would you wait until next
15 winter to do it? How would you go about it? Maybe you could
16 address that, have your engineers address that question.

17 MR. CLARIDGE: Yes, we could. I could
18 initially just add a couple of points to it. These are this,
19 that hydro-static testing, although it does require, obviously
20 pumps and so, some machinery does not require a great deal
21 of machinery. The machinery, if necessary, hydro-static test-
22 ing in that area could feasibly be done in the summer, for
23 instance, on LGB vehicles and so on.

24 Additionally, that particular section
25 aligns very closely to the Alaska Highway so that we don't
26 have to use the right-of-way for total access and so on. The

1 Highway could be used with a very short spur across to the
2 alignment which is very close to the highway in that area.

3 MR. CHAIRMAN: Now, I'm, I, the question
4 was, if the hydro-, if the pipe spills the hydro-static test.
5 In other words, one has to go in and locate the leak and fix
6 it, what, how would you go about that? If you're testing in
7 the summertime, you're locating the leaks, well, the spring,
8 you're locating the leaks in the spring and, you know, what
9 would be the plans for actually fixing the leaks.

10 MR. BOUCKHOUT: We'll address that
11 specifically, then.

12 MR. CHAIRMAN: Mr. Trevor.

13 MR. TREVOR: I think we'd also like to
14 follow on the question of the toxicity of the gas, which will
15 be travelling through the pipeline in reference to the possi-
16 bility of underwater leaks. We've heard testimony from both
17 yourself and from Artic Gas indicating that, really, this
18 question has not been addressed in depth, except to say that,
19 obviously, in underwater crossings the strain to the pipe is
20 greater and so, I think the panel would like to know if we can
21 be provided with an analysis, a full analysis of the gas
22 which will be passing through the pipeline and a chemist re-
23 port on the solubility of the toxic elements in that.

24 MR. BOUCKHOUT: Yes, Mr. Trevor, I'll
25 pursue that with our engineering department and try and pro-
26 vide that information for you.

Mr. Bouckhout
Ms Pier Archibald
Mr. John Elwood

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1 MR. CHAIRMAN: Any questions from staff
2 on, to Foothills?

3 On clarification of the application, is
4 that a fair ball right now, Mr. Bouckhout. I think we're done
5 for the day and we have an opportunity to explore some of the
6 questions we have on the application.

7 MR. BOUCKHOUT: Certainly.

8 MR. CHAIRMAN: For those that you don't
9 wish to answer now, we'll table them for answering later.

10 MR. BOUCKHOUT: Yes.

11 MS. PIER ARCHIBALD: Is it not possible
12 to test the pipe with air, rather than water?

13 MR. CHAIRMAN: Excuse me, Pier, would
14 you identify yourself?

15 MS PIER ARCHIBALD: Oh, sorry. Pier
16 Archibald.

17 MR. BOUCKHOUT: Yes, it is possible to
18 test the pipe with air, as opposed to water. I believe there
19 are implications relative to what yield strength you can test
20 at with air as opposed to water. Perhaps John Elwood, who is
21 with our group here as well could perhaps give you a bit more
22 information on that.

23 MR. JOHN ELWOOD: There are two factors
24 that need to be considered in contemplating an air test. One,
25 that Mr. Bouckhout pointed out is the test. In testing with
26 water you can test to 110 per cent of yield of the pipe. That's

1 allowing a higher operating pressure. This is not possible
2 with an air test because of lack of the control, really, over
3 the amount of fluid and the amount of stretch that you're put-
4 ting on the pipe.

5 The second matter is one of safety.
6 That water water tests are safer because the water is an incom-
7 pressible fluid and when you're looking for failures and testing
8 to very high pressures, safety does become an important consid-
9 eration.

10 MR. CHAIRMAN: Could you elaborate on
11 the safety, what, safety to whom?

12 MR. ELWOOD: In a safety to the men and
13 equipment or anybody who might be in the area where the test
14 is being conducted.

15 As you can appreciate, the line, a fail-
16 ure in the line that was full of a compressible fluid, such as
17 air or natural gas, if the line fails, you have really quite a
18 release of energy as that fluid, be it air or gas, comes out.
19 In doing the test, you're specifically looking for a failure
20 so you're testing at much higher pressures than you would oper-
21 ate at. And, of course, you have a greater chance of failure
22 in a test than you would in operations.

23 Again, you have personnel working right
24 on the, right on the pipe where your test heads are set up. If
25 it should happen to break there, there is a tremendous release
26 of energy as that fluid comes out. If you're testing with

1 a non-compressible fluid, such as water, you need release only
2 a few gallons of water to take the entire pressure off the line,
3 whereas you must release many thousands of cubic feet of the
4 compressible fluid in order to get the pressure out of the line.

5 MR. CHAIRMAN: Please identify yourself.

6 MR. VLADIMIR SCHILDER: Vladimir Schilder.

7 I have a supplementary question. How long will be the testing
8 section?

9 MR. ELWOOD: How long will the test sec-
10 tions be?

11 MR. SCHILDER: Could you indicate the
12 range of expectance which you may expect?

13 MR. ELWOOD: Depending on terrain, test
14 sections would be perhaps five miles long, three to five miles
15 would be the longest section. Shorter sections where you're
16 into major changes in elevation for that given section.

17 MR. SCHILDER: Could you specify farther
18 how much time is planned for testing of one section?

19 MR. ELWOOD: How much time is planned?
20 I'm not really sure that there's any specific plan for that.
21 The test is kept on for 24 hours. I can recall experience in
22 testing pipelines in Alberta, where generally it may take us a
23 day to fill and a half a day to pressure up, a day to hold the
24 test and another day to empty it, assuming that the test went
25 all right, that would be roughly what it would take. But the
26 test pressure is held for a 24 hour period.

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1 MR. BOUCKHOUT: I've just spoken to Mr.
2 Byers here, behind me and he indicates that for testing a sec-
3 tion, in order to expose the pipe, put the test heads on, in-
4 sert the water, bring it up to test pressure, plus a 24-hour
5 stand-up, in total it would take approximately four days, in
6 that order, for a test section to be completed.

7 MR. SCHILDER: Another supplemental ques-
8 tion would be is the applicant ever of potential limitations
9 with the sources of water for water-testing? I'm making that
10 supplemental question in connection with the answer which was
11 asked previously, that an average length of section tested
12 would be between three and five miles, which would indicate
13 that, in connection with your diameter, 48 inch proposed,
14 quite a considerable amount of water, especially in the situa-
15 tion where water is not available. Calculated roughly, one
16 mile would require something like, maybe, 3,000, or 2,000 cubic
17 meters, which may be a significant figure in that situation that
18 water is not available. Would, have you taken into account that
19 possible limitation with your program?

20 MR. BOUCKHOUT: Yes, sir, the people who
21 would have worked on the hydro-testing procedures are quite a-
22 ware of the fact that in some cases we may have to go some dis-
23 tance to a source to test a particular section. Taken into
24 prospective, with the routes that we're dealing with, it doesn't
25 appear that there will be very many circumstances where we'll
26 have to go very many miles to get an appropriate water source,

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Mr. Elwood, Mr. Low, Mr. Lister

1 but there certainly will be instances where we'll have to
2 either truck or pump small diameter surface lines water from
3 distance to a test section.

4 MR. SCHILDER: Thank you.

5 MR. ELWOOD: If I could add something to
6 that, it also is a fairly common practice to pump the water
7 from one section once the test is done, into the next section
8 and test it and then pump it further down the line. So, it can
9 be done without filling the whole line with water from a sep-
10 arate source.

11 MR. CHAIRMAN: Mr. Low, you had a ques-
12 tion?

13 MR. DAVID LOW: No, Vladimir answered
14 it.

15 MR. CHAIRMAN: Oh, I see.

16 Mr. Lister.

17 MR. BRENT LISTER: Brent Lister, a
18 question to Mr. Bouckhout. The application to NEB in Regina
19 is not all that clear on Foothills' policy with respect to the
20 timing of stream crossing. In one case, you indicate that
21 "where practical, consideration will be given to the temple
22 component of fish life history patterns" and so on. I just
23 wondered if you might elaborate on your policy a bit more?

24 MR. BOUCKHOUT: Yes, sir, as a general
25 comment if there were no mitigating factors with respect to
26 summer construction, one would cross the streams as the construc-

1 tion spread came to them. With respect to larger crossings,
2 for instance the very larger rivers and so on, you would tend
3 to opt for crossing them at low flow or towards low flow. So,
4 in that respect, what we're doing now in the purpose for a num-
5 ber of the fish studies and so on that we're undertaking, is to
6 determine within our construction framework, within, for in-
7 stance, the summer construction framework, which streams might
8 be sensitive during the period that they would potentially be
9 crossed during the normal proceeding of the construction
10 spread.

11 We do have, with respect to the larger
12 crossings, and where necessary the smaller crossings, consid-
13 erable flexibility in the timing of crossing, particularly
14 in the larger crossings where the stream crossing itself is
15 done with a separate crew. This would be applicable to such
16 rivers as the Yukon River, for instance, the Takhini River,
17 the Teslin River and so on, where the crossing is of a major
18 nature and therefore would be done with a separate crew, aside
19 from the normal mainline construction crew. In those cases,
20 one has a considerable amount of flexibility of taking the crew
21 in, either during the summer or during winter, or whatever,
22 particularly with the accessibility again. A great number of
23 those crossings are very close to the Alaska Highway. We have
24 considerable flexibility because of accessibility to them.

25 With respect to the smaller crossings,
26 as I said, the fisheries program's now looking at the implica-

1 tions of spawning beds and so on. A design to assess the loca-
2 tions of the crossings so that if there are very serious en-
3 vironmental implications where a particular locations has been
4 selected, that an alternate location could be proposed. Se-
5 condarily, given the location, it's a matter of assessing
6 the utilization and the implications in location, relative to
7 timing, and when I say timing, I'm primarily speaking of the
8 crossing procedures and what the effect of crossing in normal
9 course of mainline construction might be.

10 So, unless otherwise specified, for
11 small crossings, it would be done in a normal course of main-
12 line construction.

13 MR. LISTER: A supplementary question
14 would be, in the sections of line that you planned to build
15 in the winter, if studies indicate that that would be not a
16 desireable time from a biological standpoint and that summer
17 construction might be preferable on certain crossings, are you
18 prepared to adjust your schedule accordingly?

19 MR. BOUCKHOUT: Now, are you speaking,
20 sir, in terms of the entire mainline construction, or just
21 river crossings?

22 MR. LISTER: I'm talking in terms of
23 stream crossings and so-forth.

24 MR. BOUCKHOUT: Yes, yes, if a situation
25 were to arise whereby it would be an unaccessible impact re-
26 sultant from a winter crossing in that particular area, there

1 could be - and in most of those streams that we're talking
2 about we have in fact done winter assessments on those streams
3 in winter construction areas, and the streams are quite small
4 and, if necessary, we could put in a small scale summer cross-
5 ing through, if that were deemed necessary.

6 MR. SCHILDER: One supplementary ques-
7 tion. When would Foothills be ready to be specific concerning
8 timing of river crossings, in general, not only timing of the
9 major river crossings as you specified them according to your
10 criteria use, but for river crossings in general, and especial-
11 ly for river crossings which might be designated as environmen-
12 tally sensitive from the point of view of aquatic biology?

13 MR. BOUCKHOUT: Under the current
14 schedule, sir, we have completed fall aquatic studies and win-
15 ter aquatic studies and spring aquatic studies. We only have
16 one season left to go for the first yearly cycle to give us
17 a good year-round picture of the implications of the crossing
18 locations, with respect to aquatics, fisheries in particular,
19 and other aquatic considerations.

20 This yearly cycle will then enable us
21 to, barring further developments subsequent, in subsequent
22 studies which will carry on after the initial year has been
23 completed, enable us to do a very definitive assessment of the
24 environmental implications of crossing, as currently scheduled.
25 Which, as I said, was, in terms of the minor crossings, that
26 will be crossed during the normal procedure of the pipeline

1 mainline gang. And, the biologists who are responsible for
2 doing this work will be responsible for assessing the site
3 specific details resulting from the studies that will have
4 been carried out over that complete yearly cycle; relating
5 that to the current schedule on stream crossing, mainline
6 construction and then identifying and isolating those cross-
7 ings which, for one environmental reason or another, should
8 not be crossed during that presently proposed time span.

9 In other words, unless something arises
10 in these studies that indicates a) the crossing is not a
11 good crossing in a particular location or the timing which
12 is currently proposed is not good, then it will go on as cur-
13 rently proposed, which is to be crossed, as I mentioned, dur-
14 ing the normal construction period.

15 We will be looking for options to that
16 where we find that there is environmental construction sche-
17 dule contradiction.

18 MR. CHAIRMAN: Mr. Low.

19 MR. LOW: Well, how useful do you think
20 your past winter's ungulant surveys have been, keeping in
21 mind that the last winter was very atypical for Whitehorse
22 area?

23 MR. BOUCKHOUT: Yes, we realize that.
24 In terms of comparing some of the results we got over the
25 past winter with results of previous surveys that have been
26 conducted, it appears that they're pretty representative for

ungulants, such as sheep and caribou.

In terms of moose, they may not be very representative. It appears that over the past winter, what happened, given the lack of severity in the winters, that the moose did not come back down in very great numbers from the high country. In other words, they stayed up fairly high and did not come into the valley bottoms, as might be expected in normal or more severe winter.

From what I gather by talking to our biologists who conducted the surveys, in terms of sheep and caribou and so on, it appears to be pretty representative. In fact, the fellow is here who did the surveys, if you want some elaboration on it, but that's in general terms, is our impression of it.

MR. LOW: Do you not think that the Dall sheep could be more widespread on their winter range on a mild winter than a severe one? Specifically, I'm talking about the Ibex Pass, where it may be an underestimate of sheep in the Ibex Pass area - if it is indeed critical range.

MR. BOUCKHOUT: I'll hand it over to Mr. Ron McLaughlin, who is one of the biologists with Beak Consultants and the fellow who lead the aerial surveys this past winter.

MR. RON MCLAUGHLIN: It's possible that the Dall sheep winter range may have been more widespread this past winter, but I think that additional winter data will

1 be required to document that.

2 MR. LOW: Thank you.

3 MR. BOUCKHOUT: I might add, this, in
4 terms of Ibex, which is one that your brought up specifically,
5 there have been a fair number of flights over the Ibex, both
6 by ourselves and by the Game Branch people, as well. This
7 was compiling, whenever the opportunity presents itself, an
8 estimate, particularly of the number of sheep which might be
9 found on the height of land north of Echo Hill and so on.
10 We have had discussions with Game Branch people in that res-
11 pect and are hoping to have all the data compiled as the
12 proceedings go on so that this data can inputted as part of
13 the data bank in that particular area, which, at present,
14 based on our own work, is based strictly on one winter survey
15 or winter surveys done in one winter period, rather.

16 MR. CHAIRMAN: Mrs. Archibald.

17 MRS. ARCHIBALD: Neil, have you done
18 any experimental work at all, have you done any studies of
19 compressor noise and their effect on Dall sheep or caribou,
20 or bears, waterfowl.

21 MR. BOUCKHOUT: No, we haven't.
22 What's - of course you're aware it's, that some simulator
23 studies were done by Additionally, we've talked
24 to a number of people who have been involved in compressor
25 station operation in Alberta, with respect to what the
26 circumstances are relative to wildlife - moose, sheep, water-

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1 fowl - in the immediate vicinity of operating compressor
2 stations in Alberta and you'll appreciate that a number of
3 the compressor stations which are operating are, in fact, in
4 terrain which is very similar to this. They do have moose
5 populations, deer populations, and so on, and the impression
6 we've gotten from them is that they have, on many occasions,
7 seen moose and deer grazing, browsing at the fence line.

8 The compressor station noise, in gen-
9 eral, is a constant. It's not a variable noise source which
10 is injected, withdrawn, injected, in an unpredictable fashion.
11 It's, is a constant noise source, except for the infrequent
12 potential for a blow-down or something like that, which is
13 obviously different, but, in general, the compressor station
14 noise is a constant noise source and it appears that, at
15 least from existing experience with currently operating
16 compressor stations, the animals in the locality accomodate
17 to this constant source.

18 MRS. ARCHIBALD: Thank you.

19 MR. LOW : Neil, how are you go-
20 ing to implement the enforcement of firearms on the pipeline,
21 especially if you are hiring residents - by the control of
22 firearms or disposal of problem animals?

23 MR. BOUCKHOUT: In terms of firearms
24 and our company policy has deemed that the only firearms
25 allowed in camp will be those under the security of the camp
26 superintendent or somebody designated therefore, I would

1 think that in terms of enforcing it would have to be a condition
2 of employment, that no one can have firearms in camp.

3 MR. LOW: Does that mean that anybody
4 working on the pipeline has to live in the camp then?

5 MR. BOUCKHOUT: No, it does not. No, it
6 does not. Local residents may work on the pipeline and yet still
7 live at their homes.

8 MR. CHAIRMAN: Are there any questions
9 from the floor on Foothills' application and then I will call
10 for anyone in the audience who would like to address the panel
11 who is not registered.

12 Would you please identify yourself.

13 MR. RUSS CRUM: My name is Russ Crum,
14 with the Yukon Conservation Society. One thing I'm interested
15 in is, I understand the panel has been given the task of looking
16 at all routes, including the Alcan route, through the Yukon.
17 Alternate routes such as the Tintina Trench and the Dempster Lat-
18 eral. I'd be interested to know if the panel is going to do
19 much the same thing as the NEB did in requesting Foothills to
20 provide data with respect to the Dempster Lateral. Will the
21 panel be asking Foothills to consider the Tintina Trench?

22 MR. CHAIRMAN: Not per se. Foothills
23 has made available to us the information on the study's econo-
24 mic and engineering studies they have done on the Dempster alter-
25 native, but we are not asking Foothills to carry out specific
26 studies on any of the other alternatives, other than the one

1 proposed.

2 MR. CRUM: I also understand that in
3 Faro, that John Burrell mentioned that Foothills had addressed
4 the subject of the Tintina Trench. He didn't clearly state in
5 what fashion. I just wonder if I might ask Mr. Bouckhout what
6 Foothills has done in respect with the Tintina Trench?

7 MR. BOUCKHOUT: To my knowledge, Russ,
8 we have not conducted any definitive studies on the Tintina
9 Trench, aside from having flown it. We have flown it. We've
10 flown the Dempster, obviously - for obvious reasons we've
11 flown all the available routes in the area. We have not con-
12 ducted any definitive studies, as yet, similar to the studies
13 we filed before the National Energy Board relative to the
14 Dempster Highway on the Tintina Trench.

15 MR. CRUM: One further question. We've
16 heard a great deal today, especially from the Artic Gas people,
17 concerning a corridor concept and, of course, Artic Gas has
18 suggested that possibly the corridor concept is not inherently
19 correct and they've gone on to say that even if it is correct,
20 they use a figure of five miles as a divergent, which takes
21 the pipeline out of a corridor concept. I'd be interested to
22 know what type of factors Foothills has used to define physical-
23 ly a corridor associated with the Alaska Highway, including
24 distance, and also their estimate as to which, how much of
25 their pipeline is outside of the corridor that they have desig-
26 nated?

1 MR. BOUCKHOUT: In that respect, we
2 have not physically defined a corridor. We have defined a
3 route and the route is assessed and considered in the context
4 of this project area and the project area can be as broad as
5 you want it to be. In some cases you're constrained by topo-
6 graphic features, mountain ranges and so on. We have not,
7 in fact, said we want to place our pipeline in a defined corri-
8 dor, we're going to define a corridor as 20 miles or 10 miles
9 or five miles either side of the highway. What we've done is
10 adopt the Alaska Highway routing and the area through which the
11 Alaska Highway routing occurs as a generalized transportation
12 development corridor. And we have attempted then to locate a
13 pipeline along that linear feature without necessarily going
14 through the exercise of coming to grips with what one might
15 determine a corridor. There is no specific guidelines or
16 anything of the sort which might say a corridor is "x"-miles
17 from a focal point, which might be the Alaska Highway or it
18 might be any highway or anything else, any linear feature.

19 What we do, in terms of relating the
20 pipeline to environmental considerations to the routing and
21 so on, is to look at it in the context of what else is there,
22 be it a town site, a highway, another pipeline, a recreation
23 area, or whatever.

24 MR. CRUM: I would just like to suggest
25 to the panel that one of the major issues is the fact that you
26 are looking at a pipeline which is, supposedly will travel

1 through an existing corridor and it is based on the strength
2 of that argument that this proposal has been given the credit-
3 ability to date that it has. And, if in fact, for environment-
4 al reasons that pipeline strays from what could be considered
5 physically to be a corridor that is already degraded, and in
6 fact you're looking at a proposal that is going through, to
7 all intents and purposes, wilderness in area. And, I think
8 that is an issue that should be addressed by the Inquiry to
9 decide what, in fact, constitutes this corridor which has al-
10 ready been degraded by the Highway and then to see whether or
11 not Foothills' proposal does, in fact, stay within that corri-
12 dor.

13 MR. CHAIRMAN: Is there any other ques-
14 tions from the floor?

15 Is there anyone here who wishes to
16 address the panel who hasn't registered?

17 Well, I'd like to adjourn the meeting
18 -- I'm sorry, Vladimir.

19 MR. SCHILDER: If I could, I'd like to
20 have a one supplementary question. Is - the question is in
21 connection with what the last gentleman was presenting and
22 also in connection with the one of the previous questions ori-
23 ginally raised by Dr. Hughes. I would like to ask the gentle-
24 man who presented on behalf of Foothills certain findings
25 about various, mainly thermal changes within the old right-of-
26 way of the, within the right-of-way of the old pipeline, and

1 my questions would be whether your findings, you would consid-
2 er as preliminary or whether your findings you would consider
3 as final? It's my recollection that you mentioned that your
4 conclusions have been based on something like six or twelve
5 drill holes and it's my recollection, if I understood properly,
6 that moreorless the conslusion is that no significant thermal
7 differences in thermal regime within the right-of-way, in
8 comparison with the surroundings has been found. In connection
9 with that, my understanding to the problem this is rather
10 surprising to me and it's rather just opposite, it's almost
11 just the opposite of what one would expect. The implications
12 of that conclusion may be important and may be far-reaching,
13 expecially depending how they are to be, how they are going to
14 be interpreted, in connection with design criteria for the
15 pipeline. Could you elaborate on that, please?

16 MR. BOUCKHOUT: As to the latter part
17 of your question first, I wish to make one clarification. When
18 I was referring to thermal changes, I was intending to convey
19 the state of whether the ground was frozen versus whether it
20 was thawed. The report that is coming up today will have quan-
21 tified temperature data which might help you a little more.
22 All I was saying was that the ground does not appear to have
23 thawed significantly in the locations probed.

24 To reply to the first part of your
25 question, the degree of investigation done to date is definite-
26 ly preliminary and considerably more drilling will have to be

1 done on whatever route is finally selected. If it remains
2 as it is on the present alignment sheets, there would have to
3 be considerably more drilling there, but that's not to rule
4 out other routes within the corridor that we're discussing
5 and one of them might very well be considering is the Haines
6 Products Line and by no means is there sufficient data pre-
7 sent to make a categorical conclusion.

8 I did indicate to Dr. Hughes there were
9 areas of substantial thaw settlement evident from a fly-over
10 and this would indicate contrary that there are areas that
11 have thawed to at least some depth, although we don't know,
12 the ground may have refrozen in those areas, but what is
13 significant that some of the free ice in those areas has gone
14 out and that would be a benefit because there is less settle-
15 ment that could occur from new construction.

16 DR. SCHILDER: Well, thank you. In
17 that case, I would take the opportunity to have another ques-
18 tion and I would like to ask Foothills whether Foothills is
19 ready to make a statement to guarantee that we see the design
20 strategy for the projects are going to be used, the criteria
21 to take the greatest possible advantage of the existing right-
22 of-way of your pipeline.

23 MR. BOUCKHOUT: Mr. Schilder, we have,
24 in fact, responded to questions very similar to that in one
25 of the information requests and obviously it's, it is of some
26 benefit to us, with respect to clearing in particular in the

1 area necessary to be cleared, to utilize an existing cleared
2 area such as the Haines/Fairbanks Products Line right-of-way.

3 The other implications, however, are
4 that the Haines/Fairbanks Products Line is still laying there.
5 It has not been salvaged, it has not been taken up. The pump-
6 ing stations are still there. It's still in the hands, as
7 I understand it, of the GSA, the General Services Administra-
8 tion. It has been not, has not been disposed of and obviously,
9 in terms of alternate uses of that particular cleared right-
10 of-way, many other implications would have to be taken into
11 account. So that it's in this length where our pipeline
12 route does follow that particular route, it is obviously taken
13 into account as a potential right-of-way for our own pipeline
14 uses.

15 MR. JOHN OSTASHEK: John Ostashek,
16 Yukon Outfitters Association. I have one question of the
17 Foothills people. Your compressor site, applied for, I believe
18 the Ibex, is situated in a location that will impede the tra-
19 vel of the Dall sheep from their summer range to their winter
20 range and you spoke of information you had from Alberta where
21 you've seen animals, people have seen animals feeding right
22 up to the fence line of pumping sites and compressor stations.
23 I was wondering if Foothills has undertaken a study or intend
24 to undertake a study as to how many years after a site has
25 been built before the animals return to that site?

26 MR. BOUCKHOUT: No, John, we haven't

1 done so and I would think it would probably be fairly dif-
2 ficult to do. It would be a matter of, you know, you'd have
3 to have the information before and yearly, subsequent to that,
4 to be able to say whether in fact they were there in the
5 first place and they're not now or they weren't in the first
6 place and they're coming back now or anything like that.

7 I just don't really know how a person
8 could do it and I can't give you an answer to your question
9 as to whether, in fact, when a compressor site was put in
10 that, whether they moved away initially - and I expect they
11 probably did, during construction I would think they probably
12 did. There's a lot of activity in a localized site where
13 the compressor station is installed and, forthat, the period
14 of construction activity, I would say, you know, it's a
15 virtual certainty the animals would have withdrawn from the
16 area.

17 Now, as to how long after that period
18 of activity was completed that they moved back into the area,
19 and I don't know how far they would move, either, I expect
20 not - you know, depending on the terrain and depending on
21 the species. I really can't give you a specific answer as to,
22 you know, how long would it take. I have no idea. All I
23 can base what I've said on, is the experience of the people
24 who work in the area and on the compressor stations and so
25 on.

26 MR. OSTASHEK: The reason I ask this

1 question is because I have information that when the CNT mi-
2 crowave site was built on Sheep Mountain at Haines Junction,
3 that the Dall sheep left that area for a period of five to
4 six years before they were back within range of the site
5 again. Now, if this is to happen in the Ibex River area
6 and cut off the Dall sheep for five to six years from their
7 winter range, it would have a serious effect on that popula-
8 tion.

9 MR. BOUCKHOUT: Perhaps this is unfair,
10 John, but if I might, it's my impression that Heckel Hill is
11 not used by Dall sheep, that the height of land north of
12 Heckel Hill is - we're aware of that. It's my impression
13 that Heckel Hill itself is not used by Dall sheep. Is that
14 true or not true?

15 MR. OSTASHEK: Well, I'll have to ar-
16 gue that because I've personally seen Dall sheep on Heckel
17 Hill. I fly over it a lot. How much of it is used, I don't
18 know. I imagine the Game Branch people have this information,
19 but I do know that it is used by Dall sheep.

20 MR. BOUCKHOUT: There is, too - and
21 we've discussed this before, to put the Ibex situation in
22 somewhat into context, we are certainly, of the impli-
23 cations, particularly with respect to Dall sheep and so on,
24 with the Ibex alignment and particularly with the compressor
25 stations. We are, in fact, due to those considerations,
26 looking at alternatives to align the pipeline out of the Ibex

1 Valley. We've stated this some time ago, in fact, before
2 the National Energy Board and before the Lysyk Inquiry.

3 There are a couple of alternatives,
4 which you'll appreciate that when you consider alternatives
5 in an area like Whitehorse, there are a lot of implications.
6 It's not easy to come to grips with where the best place to
7 be is and, from people like yourself in hearings like this,
8 we're able to get information and opinions to assist us in
9 trying to come to grips with what the best alternative is.
10 It's going to have to be a trade-off no matter how you look
11 at it, but that's the process we're going through now, is
12 looking specifically at the Ibex Alignment, which is really
13 the one we're seriously considering right now for potential
14 re-alignment.

15 MR. OSTASHEK: Thank you.

16 MR. CHAIRMAN: I, then, have a supple-
17 mental question. When would you be prepared to discuss the
18 alternatives? Would you be prepared to discuss them now or
19 in July?

20 MR. BOUCKHOUT: We would certainly,
21 Dr. Hill, be prepared to discuss them in July. We will not
22 be in a position to make a definitive statement as to - we
23 reject the Ibex routing as currently proposed or accept it.
24 Well, obviously we accept it, it is our current routing, it
25 is the one we hold by. We are, as I mentioned, aware of the
26 concerns in the area and these are particularly with respect

1 to the Dall sheep population and so on. It's a matter of asses-
2 sing what can be done with respect to those concerns, as well
3 as what alternatives may be available. So, we'll certainly be
4 prepared to discuss this and discuss the alternatives, which we
5 see as possibilities and we would hope to have as many people
6 available to discuss the situation.

7 MR. CHAIRMAN: Thank you.

8 Are there any other questions of Foothills
9 from the floor?

10 Yes?

11 MR. IRWIN ARMSTRONG: My name is Irwin
12 Armstrong. I've discussed the matter of game with quite a few
13 people and they are of the opinion that cattle ranching possi-
14 bilities could easily supplement any losses in game and that
15 there is no need of all this uproar of the possibility of game
16 diminishing, because they claim that the Yukon has the makings
17 of the best cattle ranching country in the world if it's proper-
18 ly developed.

19 MR. CHAIRMAN: No comment.

20 MR. BOUCKHOUT: No.

21 MR. CHAIRMAN: Any other comments, ques-
22 tions from the floor? Panel? No?

23 Okay, I'll adjourn the meeting until -
24 someone help me - until ten o'clock tomorrow morning, is it?
25 Ten o'clock tomorrow morning, when we'll hear Mr. McCandless
26 and the Businessman's Association of Haines Junction, Ornitholo-

1 gical Survey of Canada and Ms Ernie Watson.

2 Okay? Meeting adjourned.

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4 ADJOURNED
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GOVT PUBNS

ENVIRONMENTAL ASSESSMENT REVIEW PANEL

IN THE MATTER OF AN APPLICATION BY FOOTHILLS PIPE
LINES (YUKON) LTD. TO THE MINISTER OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT FOR A GRANT OF THOSE
INTERESTS IN THOSE AREAS OF TERRITORIAL LANDS IN THE
YUKON TERRITORY AS MAY BE NECESSARY FOR THE CONSTRU-
TION AND OPERATION OF THE SAID NATURAL GAS PIPELINE
AND THE WORKS AND FACILITIES CONNECTED THEREWITH AND
INCIDENTAL THERETO,

AND

IN THE MATTER OF A PANEL TO REVIEW THE ENVIRONMENTAL
ISSUES RELATED TO THE PROPOSED ALASKA HIGHWAY GAS
PIPELINE.

THE CHAIRMAN: DR. H.M. HILL

MEMBERS: DR. O. HUGHES
MR. L. CHAMBERS
MR. B.J. TREVOR
MR. C. WYKES
DR. D. LACATE

PROCEEDINGS

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JUNE 14TH, 1977

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GAS STUDY LTD.

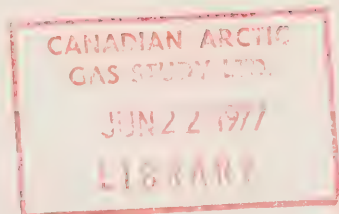
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Whitehorse, Yukon Territory,
June 14th, 1977.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT).

MR. CHAIRMAN: Good morning.

Could I ask, before we get started formally, could I ask
if we could ask Foothills to introduce their team?

MR. BOUCKHOUT: Thank you Dr.
Hill. I'll introduce the people who are with us here today
and their relevant disciplines.

On my extreme right is Bob Byers.
He's a biologist with the Environmental Department of
Foothills in Calgary. He's been involved in the Alaska
Highway project for some time, also worked on pipelines
prior to becoming a biologist.

On my immediate right is Mr. John
Elwood, who is the Manager of our office here in Whitehorse.
John works primarily on the social-economic aspects of the
project, but is also an engineer and has experience with
compressor stations and so on.

On my left is Mr. Court Frooks.
He's a geographer with our Environmental Department in
Calgary. His primary experience before coming to us was in
the Mackenzie Valley, relative to the Mackenzie Highway.

Behind me, on the right, is Mr.
Fred Claridge, who is an Executive Engineer with Klohn
Leonoff Consultants Ltd., geotechnical consultants.

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1 On his left is Mr. Ralph Hudson,
2 Counsel for Foothills from Vancouver. On his left is Mr.
3 Phil Ullman, Assistant Manager of Beak Consultants Ltd. who
4 are primarily, biological consultants.

5 Mr. Ullman's area of expertise is
6 primarily air and water quality.

7 Beside him is Mr. Dave Fernet.
8 Dave is a Fisheries Biologist with Beak and Dave was primarily
9 in charge of the Spring Fisheries Program for instance,
10 which has just been completed and now being written up.

11 On Dave's left is Dr. Herman
12 Vaartnou. He's the President of Vaartnou and Sons Enter-
13 prises Ltd. and Vaartnou and Sons Enterprises are revegeta-
14 tion consultants.

15 And on his left finally, is Mr.
16 Ron McLaughlin. Ron is an mammalogist with Beak Consultants
17 and I previously introduced him yesterday. Ron was involved
18 in the winter ungulate surveys and so on that we conducted
19 this past winter.

20 MR. CHAIRMAN: Thank you very
21 much.

22 MR. BOUCKHOUT: If I might
23 additionally, Dr. Hill, a couple of things that I mentioned
24 yesterday which now arrived, that I can put forward. One
25 is in response to one of the information requests received
26 from the Panel -- the Panel staff. I'd like to provide that

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1 to you now. In addition with that particular information
2 request, we are providing a copy of a document entitled
3 'Environmental Assessment and Determination Report' which
4 was done by Mr. Ken Lindback, relative to the Haines-Fair-
5 banks Products Line.

6 Additionally, I have ten copies
7 of the Progress Reports regarding the spring waterfowl
8 migration study which I also mentioned yesterday which I can
9 put forward now.

10 MR. CHAIRMAN: Thank you.
11 Robert McCandless, I'd like to call upon you to present
12 your briefs at this time.

13 MR. McCANDLESS: I have two
14 briefs. One concerning pipeline rupture, the other concerning
15 compressor noise and other environmental aspects and I will
16 read them in to the record.

17 The first brief is entitled 'The
18 Risks and Consequences of Gas Pipeline Rupture in the Foot-
19 hills (Yukon) Proposal.'

20 The purpose of this brief is to
21 analyze the environmental hazards posed by a possible pipe-
22 line rupture and to make recommendations regarding the pipe-
23 line construction and routing along the Alaska Highway. The
24 Panel is requested to refer to the Task Force on Northern
25 Oil Development Report Number 74-3, entitled 'Gas Pipelines
26 in the Mackenzie River Valley: Estimation of Fire and

Hazard
1 Explosion/Caused by Pipeline Rupture'. It is available in
2 the Whitehorse Library and also the Archives.

3 Nowhere in its supporting evidence
4 has Foothills Pipe Lines (Yukon) Ltd. directly addressed
5 the certainty of a chain of events resulting from its pro-
6 posed pipeline: rupture, explosion and fire. Since the
7 prevention or limiting of these events is largely a matter
8 of government regulations, this Panel is urged to consider
9 the possibility of rupture as the major environmental hazard
10 of the Alaska Highway pipeline proposal.

11 Pipeline ruptures can occur from
12 a variety of sources. The Task Force Report lists manufac-
13 turing defects, corrosion, damage, improper field practice
14 and human error. The Foothills estimate of one rupture in
15 fifteen years is based on three years of data on gasline
16 ruptures in the United States and data from an unspecified
17 period in Canada.

18 None of these lines would have
19 traversed permafrost. On Page 2E-6.4, Foothills presents a
20 hypothetical rupture scenario without stating the cause of
21 the rupture. The forty-eight inch proposal filings do not
22 amend this section. Presumably, Foothills anticipates a
23 rupture caused by differential melting of permafrost. Since
24 their probability of rupture estimate is based on smaller
25 pipelines in non-permafrost areas, there is an obvious con-
26 flict in their evidence. The likelihood of rupture must be

1 something more than once in fifteen years, particularly in
2 northern sections where permafrost areas will be encountered.

3 A pipeline rupture may induce a
4 propagating fracture in which the pipe splits longitudinally
5 up to one thousand feet, limited finally by pipe and ground
6 conditions and the pressure drop of the escaping gas. While
7 a rupture may not necessarily cause a propagating fracture,
8 such fractures pose the greatest danger to human life,
9 property and the environment.

10 Calculations by Foothills show
11 that a through-wall tear of merely six inches in length
12 may be sufficient to induce a propagating fracture. A
13 fracture may also start from a longer, deep scratch in the
14 pipe such as may be caused by careless heavy equipment
15 operation. For whatever cause, careless or a pipeline
16 kinking in permafrost, a fracture is a dangerous possibility.

17 The Foothills forty-eight inch
18 scheme proposes a distance of about seventy-five miles
19 between block valves or places where the line can be sealed.
20 These valves are automatically controlled at the compressor
21 sites. If a fracture was to occur, the gas pressure drop
22 would be detected by sensors, which then shut the valves.
23 All the gas in seventy-five miles of forty-eight inch pipe
24 at 1,260 pounds per square inch would then escape to form
25 an enormous cloud, prior to ignition. Obviously, the cloud
26 poses extreme danger to the area, immediately adjacent to

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1 the rupture.

2 The Task Force Report on the Arctic
3 Gas proposal referred to analyzes four possible rupture
4 scenarios involving a forty-eight inch line at 1,600 pounds
5 per square inch and with only twenty-four miles between
6 block valves.

7 Depending on the location of the
8 break between the valves, the escaping gas could in about
9 thirty minutes, form a cloud or a plume two hundred feet
10 thick, two thousand feet wide and up to a mile long. The
11 fringes of the cloud would be dangerously inflammable
12 immediately. Not until about an hour later, would the plume
13 be dissipated enough to be safe. Where the rupture occurs
14 close to a steep hill, the lack of dispersion room would
15 make the cloud dangerous for a much longer period of time.

16 The Foothills proposal uses the
17 same diameter of pipe but at a reduced pressure, however,
18 the distance between block valves is much greater, seventy-
19 five miles as opposed to twenty-four. That seventy-five
20 miles I should add, is an average between the air compressor
21 stations. Calculations of the rates of flow from a rupture
22 and the size of the resulting plume, would give a more
23 meaningful comparison between the two pipeline proposals.

24 It is obvious, however, that the
25 gas cloud escaping from the Foothills pipe would be far
26 larger, would last much longer and would be more dangerous

1 by several orders of magnitude.

2 I would like to add here that I
3 did do some sort of back of the envelope calculations. I
4 don't profess to know differential equations by any means,
5 but it seems to me that it would be larger by a factor of
6 three or four -- that is three or four times larger than
7 the plume size indicated in the preceding paragraph.

8 The Task Force Report on the
9 Arctic Gas proposal warns of the risk posed by exposed flame
10 or motor vehicles on the fringes of the dispersing plume.
11 For the cases it examined, it recommends:

12 (1) No air or surface vehicles
13 to enter a two mile radius of the rupture for a minimum of
14 two hours depending on climatic conditions. Highways should
15 be closed to traffic.

16 (2) The pipeline should pass no
17 closer than two miles to any settlement to prevent acciden-
18 tal ignition of any escaped gas.

19 (3) Adequate fire-fighting equip-
20 ment should be stationed in areas when the line passes with-
21 in two miles of forested areas.

22 Either the recommendations of the
23 Task Force Report are absurd, or Foothills has neglected to
24 mention all the environmental risks posed by their proposal.
25 If their line was to rupture, it is virtually certain that
26 the gas would be ignited anywhere along the Alaska Highway.

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1 The Foothills application appears
2 to be a least-cost design, thus their "all-events" tariff
3 would be attractive to potential gas shippers. If the
4 design is to be modified to reduce rupture and fire risk,
5 this Panel or others like it, must balance the public safety
6 against the economic arguments of the applicant. The
7 possible trade-off is clear; the public safety against the
8 lowered capital cost of the Foothills proposal.

9 I submit that, regardless of
10 capital cost, the design must be modified to reduce the
11 risk of rupture and the environmental hazards in that event.
12 First, the spacing between block valves must be reduced so
13 that if the line ruptures, the volume of gas escaping will
14 be smaller.

15 The limiting or worst case design
16 aspect must be the size, duration and movement of a possible
17 gas plume compared to the public safety along the highway or
18 adjacent to the communities. A complete risk analysis is
19 required involving climatic considerations, populations,
20 traffic flows and relative fire hazards.

21 Secondly, the risk of rupture
22 should be thoroughly analyzed in a separate study and if
23 possible, reduced to a probability far below that of the
24 Foothills filed design. Deeper burial, modified or rein-
25 forced girth welds, heavier walled pipe, reducing operating
26 pressures and/or raised gas temperatures, may be means of

1 increasing the safety of the pipeline.

2 Third, Foothills should supply
3 more details of its "leak-before-rupture" detection system
4 and if necessary, modify it to make it more sensitive.
5 Present designs show seventy-five miles of pipe between
6 pressure sensors. The amount of gas lost would have to be
7 very large or very rapid to register over that distance.

8 It would take several minutes for
9 the pressure wave from a rupture to travel down the pipe and
10 activate the sensor. During this time, the compressor would
11 push more gas towards the rupture, increasing the quantity
12 released.

13 I should add here that if a rupture
14 occurs, it will take some time for the sensor to respond.
15 This is the point I am trying to make here.

16 Foothills' evidence does not show
17 the sensitivity of the sensors, relative to rapid loss in
18 gas volume. At the other extreme, a rupture could occur
19 that is smaller than the critical size and that releases some
20 small quantity of gas, too small to register on the gas
21 sensors at the compressor station. This small quantity
22 could still be large enough to be a fire hazard. The filed
23 evidence should show that quantity and the possible risk.

24 The environmental hazards of gas
25 pipeline rupture arise from fire and explosion. Since a
26 rupture would be more likely in summer, due to permafrost

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1 melting problems, the risk of forest fires would also be
2 greater. The Task Force Report gives some information on a
3 rupture in a twenty inch line in Alberta, caused by ground
4 sloughing and kinking of the line. The resulting explosion
5 dug a hundred foot diameter crater and the fire covered half
6 a square mile. The quantity of gas lost from a forty inch
7 line -- forty-eight inch line would cause damage inconceivably
8 larger.

9 Foothills treats rupture only as
10 a statistical possibility. Beginning on Page 2E-6.4, the
11 application discusses a hypothetical rupture scenario with-
12 out mentioning possible explosion and fire hazard at the
13 site or measures to protect the public. Notification of
14 local authorities appears to be a low priority. The company
15 says at the beginning of this section "foremost concern will
16 be to restore gas service as quickly as possible," and not
17 to protect the public safety and the environment.

18 I submit that the Environmental
19 Review Assessment Panel consider the following in making
20 its recommendations:

21 (1) Foothills and a government
22 agency should each undertake independent study of the
23 environmental risks posed by pipeline rupture. These studies
24 should show a variety of cases based on most probable climatic
25 conditions, fire hazard and variable distances for block
26 valve spacing. The Task Force Study referred to would be a

1 good basis for comparison.

2 (2) Foothills should show cost
3 estimates for various spacings of block valves between the
4 compressor sites. It could also analyze the various means
5 and costs of reducing rupture risk, mindful that the size of
6 the gas plume and the public safety should be of greater
7 concern than the increased capital cost and the economic
8 feasibility of their project.

9 (3) Foothills should explain
10 fully, the sensitivity of pressure sensors relative to delay
11 in shutdown after rupture and their sensitivity to small
12 continuous losses of gas.

13 (4) Foothills should be prepared
14 to post a bond sufficient to absorb all costs, public and
15 private, incurred in the event of pipeline rupture with or
16 without explosion or fire.

17 (5) Either the recommendations
18 of the Task Force Report described earlier, should be followed
19 and adopted -- adapted for the larger gas plume size of the
20 Alaska Highway proposal, or the block valve spacing should
21 be shortened to reduce the size of the gas plume.

22 The Panel should not consider the
23 National Energy Board regulations adequate for Yukon con-
24 ditions of discontinuous permafrost and extensive forest.

25 That concludes my first brief.

26 MR. CHAIRMAN: Does the Panel

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Mr. B. Trevor

1 members -- do the Panel members have questions?

2 MR. TREVOR: Mr. McCandless, I
3 gather from the presentation which you've just given us,
4 that you were not able yourself to do a sort of statistical
5 review of leaks and ruptures, that you've taken this as a
6 summary from other sources. Is this correct?

7 MR. McCANDLESS: I haven't been
8 able to do a study, no. I have read -- most of the materials
9 that I've received as a National Energy Board intervenor,
10 where it has referred to rupture. Now, this is Arctic Gas
11 playing off against Foothills and vice versa.

12 I tried -- what I made reference
13 to here was Foothills' own support for their probability of
14 rupture and Arctic Gas took issue with that. I haven't
15 studied it myself, no. There's no information in town.

16 MR. TREVOR: No, I was just
17 wondering whether you were able to determine any information
18 that we wouldn't be able to get from other sources.

19 MR. McCANDLESS: No.

20 MR. TREVOR: In your final para-
21 graph, you made reference to the National Energy Board regu-
22 lations at present. You're referring then to existing pipe-
23 lines -- regulations that have been established for existing
24 pipelines. Is this correct?

25 MR. McCANDLESS: Yes. What I was
26 thinking of here is that for example, Alberta Gas Trunk, who

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1 is I take it, is the push behind Foothills, on their forty-
2 eight inch proposals through Alberta, they used twenty-four
3 mile block valve spacing. I assume that that's an Alberta
4 regulation.

5 Up here, Foothills goes to seventy-
6 five miles, so I assume it's covered by some national set of
7 regulations -- National Energy Board regulations. So as I
8 say, they may not be adequate.

9 MR. TREVOR: Yes, fine. We'll
10 look into that point. Thank you.

11 MR. CHAIRMAN: Mr. Wykes?

12 MR. WYKES: Mr. McCandless, I
13 wonder if you could tell us whether or not the Task Force
14 Report on the Arctic Gas proposal in the -- for scenarios,
15 they analyzed looking at the gas plumes from a rupture, did
16 look at conditions where there might be a very intense air
17 inversion and no wind movement.

18 MR. McCANDLESS: If I'm not mis-
19 taken, their ruptures were all in the summer, the four cases
20 that they considered, so I think inversion would be unlikely
21 in summer conditions or less likely than winter.

22 MR. TREVOR: Is it your conten-
23 tion that the dissipation of the gas under intense inversion
24 conditions might take a much longer period of time?

25 MR. McCANDLESS: I'd have to
26 think about that.

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1 I don't honestly know. I didn't
2 consider it. I suppose I should have, but I don't know how
3 that would affect the dispersion of the plume. I couldn't
4 -- I'd just be guessing. I'd have to work it out.

5 MR. TREVOR: Perhaps you could
6 also clarify one thing for me too. You indicated it would
7 be the fringes of the cloud which would be dangerously
8 inflammable. Would it only be the fringes?

9 MR. McCANDLESS: Well, the
10 cloud is moving. There would be some turbulence around the
11 fringes so that it would be mixed with air to the propor-
12 tions between five per cent and fifteen per cent and there-
13 fore, would be inflammable. Farther into the cloud, the
14 concentration of the gas would be such that it wouldn't
15 necessarily be flammable and beyond the fringes, it would
16 be too diluted.

17 MR. TREVOR: Thank you.

18 MR. CHAIRMAN: Mr. LaCate?

19 MR. LaCATE: Mr. McCandless,
20 although in your -- you haven't explicitly stated that be-
21 cause of hazards -- I'm sorry -- are you suggesting, although
22 it's not explicitly stated, that the pipeline should be
23 away from the highway because of the hazards?

24 MR. McCANDLESS: No, I don't
25 think I am. I'm saying either you close up the block valve
26 spacing or -- yeah, okay, move it away -- but one of the two.

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1 MR. CHAMBERS: Mr. McCandless,
2 you were suggesting that the -- Foothills look at a reduced
3 probability and I think the probability was once in fifteen
4 years. Have you any suggestion as to the reduced probability
5 of a rupture that, you know, some recommendation to us as to
6 your thinking on that line?

7 MR. MCCANDLESS: Some of the things
8 that are mentioned in the brief as -- actually Foothills
9 has put them forward -- as being likely to reduce rupture
10 below this fifteen years.

11 Now, this fifteen year figure
12 was for the forty-two inch line and they say that for forty-
13 eight inch line, it is a reduced possibility beyond that,
14 but they themselves say that certain features of their line
15 such as -- and then they list them -- are apt to reduce
16 fracture. But if you want one way of looking at it, is to
17 see the Arctic Gas final argument on the Foothills design.
18 They are very critical of Foothills' design as a means of
19 reducing rupture.

20 They say they're untried. I
21 think what we're dealing with here is just new technology
22 and I don't think either Arctic Gas or Foothills have all the
23 answers.

24 MR. TREVOR: Is this a point of
25 clarification, Mr. McCandless? In my reference to the final
26 arguments before N.E.B., I got the impression that the Arctic

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1 to be installed in the Alaska Highway system is a much
2 tougher pipe than is used in current systems. It's a tougher
3 grade pipe, particularly for northern conditions. We could
4 perhaps later on, as questions from the floor come, elaborate
5 if necessary, but at this time, we don't feel it's really
6 necessary to elaborate much more than that.

7 We certainly are considering and
8 always have considered, installation of additional block
9 valves. For instance, in certain high risk areas, additional
10 block valves are considered and in certain areas are warranted.
11 As I say, I go back to the Canadian Standards Association
12 which does govern the design and Foothills' design is within
13 the guidelines of the CSA.

14 MR. CHAIRMAN: There is one
15 question in the brief about rate of leak that would go un-
16 detected with regard to the automatic shut-off. Do you have
17 a figure now on what that rate would be?

18 MR. ELWOOD: I don't have that
19 at the moment. We could, if the Panel wish, to get manufac-
20 turers data from the valve controls that are now in use that
21 would give you an indication of the sensitivity of those
22 valves.

23 We haven't chosen a valve manu-
24 facturer or a valve control manufacturer for this line, but
25 they are fairly common. It's the manufacturer's data --
26 they have a pressure chamber there and an orifice restricting

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1 the outflow from that chamber. If you have a line break
2 and the gas flows out of the chamber at above a fixed rate,
3 the valve automatically closes. That is available from
4 manufacturers of those particular pieces of equipment.

5 MR. CHAIRMAN: Yes, could you
6 supply the Panel with those figures -- the rate of gas loss
7 that could be expected before the valve would be activated?

8 MR. ELWOOD: Yes.

9 MR. CHAIRMAN: Any questions,
10 comments from the floor? Would you like to -- I'm sorry
11 -- Mr. Wykes?

12 MR. WYKES: I'd just like to
13 follow-up with Mr. Bouckhout. The possible addition of more
14 block valves on the line. What kind of criteria would you
15 use to define the high risk areas where these might be
16 required?

17 MR. BOUCKHOUT: In that respect
18 Mr. Wykes, the way it's done with the Canadian Standards
19 Association, it's -- the risks are determined and the kind of
20 area is determined on a ranking scale, with respect to
21 habitation within a certain specified distance of the pipe-
22 line itself.

23 There may be other situations wherein
24 one would consider additional block valves and one which
25 comes to mind immediately, which we have spoken about before,
26 is the potential installation. In fact, we intend to install

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1 additional block valves in an area in the vicinity of
2 Kluane Lake where we're dealing with the Shakwak Falls zone
3 for instance. Additional block valves in the Falls zone
4 would be installed to isolate or give the facility to isolate
5 a smaller section where there could be more potential for
6 ruptures and in other normal areas of pipelining.

7 MR. WYKES: Have you considered
8 how close the pipe would have to come to a community to
9 decide whether or not to put in additional block valves from
10 a human safety point of view?

11 MR. ELWOOD: The Canadian Standards
12 Association classifications which determine the valve spacing,
13 are based as Leo mentioned, on the number of dwelling units,
14 class one locations, which is the lowest class has ten or
15 fewer dwellings within two hundred and twenty yards of any
16 given one mile length -- two hundred and twenty yards on
17 either side of the center line of any given length -- one
18 mile length of pipe.

19 Class two locations have more than
20 ten and fewer than forty-six such dwellings or where the
21 pipe is within a hundred yards of a building occupied by
22 more than twenty persons or a well defined area, used by
23 more than twenty persons such as a park or an area like that.

24 Class three locations are those
25 that have more than forty-six dwelling units within the
26 two hundred and twenty yards of either side of the center

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1 line for one mile and class four locations are those which
2 have a building more than four storeys, where buildings more
3 than four storeys are prevalent.

4 So within those areas then, you
5 would be installing additional block valves.

6 MR. WYKES: Do you feel that the
7 CSA Standards then are sufficient for this pipeline where
8 you might have -- be going through areas of permafrost near
9 communities?

10 MR. ELWOOD: Yes, the CSA Standards
11 have recently been revised to include a section on northern
12 pipelines where this particular matter was considered. The
13 standards as I recall them, have changed over the years.
14 As I recall, the earlier standards where valve spacing was
15 required every twenty miles in the Class one locations.

16 Now, there is no requirement for
17 valve spacings in Class one locations. These changes have
18 come about as a result of experience in the gas industry and
19 we feel that they adequately cover the situation respecting
20 northern pipelines and permafrost areas.

21 MR. CHAIRMAN: Following up on
22 that, could you give me an idea what exactly would the design
23 result in with regard to a recreational area such as a camp-
24 site at Morley River, where your line is shown as going right
25 through the center of it. If there were more than ^{ten} people
26 using that area or could use that area, this would involve

1 something in terms of a Class B was it situation. What
2 would this involve?

3 MR. ELWOOD: It will take me a
4 moment to look this up.

5 MR. CHAIRMAN: Okay.

6 MR. TREVOR: Mr. Chairman, can I
7 ask a general question while this information is being looked
8 up please?

9 MR. CHAIRMAN: Yes.

10 MR. TREVOR: Mr. Bouckhout, at
11 the community hearings held by Dean Lysyk, there has been
12 a good deal of reference to the possibilities of leaks and
13 the danger of forest fires. Would Foothills be prepared to
14 submit to this Panel, a detailed statistical review of the
15 experience in Alberta and B.C. with regard to all types of
16 leaks, including major ruptures, whether any of these ruptures
17 resulted in propagating fractures and in how many cases, did
18 ignition take place and what was the result of that ignition.
19 Whether it was a forest fire or whatever and to what extent
20 does the Alberta Forest Service and the B.C. Forest Service
21 require as certain precautions to be taken by the pipeline
22 companies, in terms of inspection of the lines, the right-of-
23 way, in terms of equipment being available, in terms of
24 sharing costs for fighting fires -- this type of thing.

25 MR. BOUCKHOUT: Yes, Mr. Trevor,
26 certainly from the files of Westcoast Transmission, Alberta

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1 Gas Trunk Line -- we can obtain that kind of information for
2 you and put together for you in tabular form or whatever
3 form is best suited to display that kind of information
4 relative to frequency of ruptures, implications, frequency
5 of ignition and so on so forth -- we'll undertake to do that
6 sir.

7 MR. TREVOR: Thank you.

8 MR. CHAIRMAN: Could I follow-up
9 on that and ask when you would expect that information to be
10 available. Could we have it before the end of June?

11 MR. BOUCKHOUT: We will certainly
12 attempt, Dr. Hill, to have it by the end of June. Some of
13 the information is already available. Certainly what we
14 will do, if we do not have the entire package together by
15 the end of June, we will submit to you by that time whatever
16 we do have together and the additional information can follow.

17 MR. CHAIRMAN: Thank you.

18 MR. ELWOOD: With respect to your
19 earlier question, Dr. Hill, the design of the pipeline in
20 Class two locations, which are those of -- you're speaking
21 of here where you have a concentrated area occupied by more
22 than twenty persons.

23 The design then would call for
24 valve spacing not to exceed fifteen miles where the line is
25 in such an area, wherein Class three locations, the valve
26 spacing shall not exceed eight miles and in Class four

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1 locations, five miles as the required spacing.

2 DR. HUGHES: Do I understand
3 correctly, that that code applies without regard to this
4 diameter of the pipeline?

5 MR. ELWOOD: Yes.

6 DR. HUGHES: That's whether
7 we're dealing with a six inch line or a forty-eight inch
8 line?

9 MR. ELWOOD: Yes.

10 DR. HUGHES: Does this take no
11 -- this apparently then doesn't consider the difference in
12 the amount of gas that you could get in that length of
13 line, depending upon whether you have -- depending upon the
14 diameter of the line as a layman when it comes to pipelining.
15 This amazes me.

16 MR. ELWOOD: The other sections
17 of the code of course, deal with other matters of pipeline
18 design. You'll find in areas, what does change as diameter
19 changes of course, is the wall thickness and the welding
20 specifications and wrapping and so on, for protection of
21 the pipe and to ensure safety. The valve spacing is set by
22 -- well, really by population density is a rough way of
23 saying it.

24 DR. HUGHES: But the thrust of
25 Mr. McCandless' argument is that, as I understand it, is
26 that the danger of explosion and the magnitude of the explo-

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1 sion has some function of the diameter of the pipeline.
2 I would guess from what he said that he would consider that
3 when you have a very large diameter pipeline with the
4 potential to release a large volume of gas per line mile,
5 that it would be important to have much closer spacing on
6 the block valve than if you were to have a much smaller
7 diameter line. This seems to me to be very common -- very
8 -- maybe my reasoning is too simple here is it, that --

9 MR. BOUCKHOUT: In fact, Dr.
10 Hughes, as Mr. Elwood has already mentioned, it -- the code
11 has in fact, evolved. It has been changed as experience has
12 been gained with existing gas pipeline systems and this is
13 with pipelines up to and including forty-two inch diameters.

14 I'm not overly familiar with the
15 document Mr. McCandless has quoted. I believe the figures
16 of plumes and clouds and so on given in that particular
17 document, are based on computer modelling and so on. I would
18 have to check back with our own people, particularly Alberta
19 Gas Trunk Line, and their experience as to what the range
20 in terms of aerial extent of consideration of these plumes
21 has characteristically been.

22 It's my understanding that the
23 code and the experience is that if in fact, a rupture does
24 occur and ignition does occur as a result of that rupture,
25 that the flare or what have you, that does result, does not
26 cover an extensive area. It's very localized and natural

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1 gas being a fair bit lighter than air, tends to move up.
2 Certainly, there's also experience in Northern Alberta and
3 Northern British Columbia and so on, with very similar
4 temperature conditions and terrain conditions that you
5 would find anywhere along the route in Yukon. Presumably,
6 these are also taken into account.

7 MR. CHAIRMAN: Are there any
8 questions? Oh, we have two over here.

9 MR. SCHILDER: I have a question
10 for Mr. McCandless. I've very sympathetic to your concerns,
11 however, I cannot ask a very sophisticated question because
12 I don't have the background in gas or fluid mechanics or
13 mechanical engineering. But however, in general, I would like
14 to ask you whether you would consider the indicated design
15 of the proposed pipeline too risky in general from the point
16 of view of potential rupture of a pipe or whether you are
17 in principle, satisfied. But you have only certain specific
18 interests which you indicated on your last page of your
19 presentation.

20 Further, I would like to also
21 hear your opinion whether you have a major objective against
22 the proposed route of the pipeline or whether you are more
23 concerned with certain -- what we could call, critical
24 reaches. There are certain implications as I interpret
25 it, within your submission, that certainly, the presence of
26 permafrost would implicate greater potential risk of a

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1 rupture of the pipe or perhaps some other areas which are
2 only implied by that example. Like perhaps, major river
3 crossings or a very close proximity of a geologically
4 sensitive area or a very close proximity to a village or a
5 city.

6 Would you be kind to answer that
7 please?

8 MR. MCCANDLESS: First of all, I
9 am a geologist by training. I'm not an engineer. I'm not
10 qualified, nor would I attempt to do so to make any comment
11 on the overall design of the pipeline. My objection arose
12 from the fact that if the pipe got a hole in it, it might
13 induce a propagating fracture which might then produce a gas
14 cloud in the order of a cubic mile and I think that that's
15 too large for the public good.

16 As far as routing goes, the closer
17 to the Alaska Highway, the better in my opinion, but again,
18 as far as river crossings go, pipeline design -- I'm not
19 really qualified, but it seems to me that we should keep
20 the corridor as narrow as possible.

21 The other concern I have is that
22 it's clear to me that if they are to modify their design
23 to increase the number of block valves for example, they
24 will incur some cost. I've tried to make the argument to the
25 Board that determining the economics of the thing in balancing
26 Foothills' arguments if they say we can't afford to do it,

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1 the Board has to take in mind the public good and that is
2 -- I'm making the case here -- the size of the gas cloud.
3 That is the main thing. The size of the gas cloud if the
4 pipe ruptures.

5 MR. SCHILDER: Thank you, but
6 could I ask a supplemental question? Would you be concerned
7 mostly with what perhaps could be designated as hardware
8 of the pipeline project, rather than with the route itself.
9 Or would you be willing to admit that there are certain
10 critical reaches which perhaps might be taken into consider-
11 ation with respect to your concerns?

12 MR. McCANDLESS: I'm not sure
13 how to answer that. The way I understand it, if they're
14 close to the road, the hazards may be greater, so there --
15 it's a hardware problem, but if they go farther away from
16 the road, they may need less hardware because of less risk
17 to life and limb, in effect.

18 I don't know how to make that kind
19 of a trade-off. I'm not qualified partly, but my preference
20 is that it should go as close to the highway as possible,
21 my personal preference.

22 MR. SCHILDER: Would you have
23 any specific concerns with the context to your presentation
24 with any major stream crossings?

25 MR. McCANDLESS: From my reading
26 of their evidence and arguments to that evidence by other

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1 intervenors before the Energy Board, I understand that those
2 are the major areas of concern in the design, that is, the
3 possibility of rupture is probably greater at river crossings
4 than any other place. So, yes, maybe river crossings should
5 be armed with a block valve at each end. Perhaps that is
6 something that the Panel could consider.

7 But again, I'm just speculating
8 here.

9 MR. CHAIRMAN: Mr. Beanlands(?)

10 MR. BEANLANDS: Mr. Chairman, I
11 have just one short question for Foothills, which relates
12 to pipeline integrity.

13 In Volume Eight of your -- dealing
14 with your forty-eight inch alternative, you indicate that in
15 general, aside from river crossings, the wall thickness of
16 the pipe will be .54 inches, while in the Muskeg areas of
17 Northern B.C., you indicate that it will be .60 inches.

18 I'm wondering if this means that
19 you feel that the terrain in Northern B.C. is more sensitive
20 or difficult for a pipeline in the Muskeg areas of the
21 western end of the Yukon route?

22 MR. BOUCKHOUT: Mr. Beanlands,
23 I'm not aware of that difference between the .54 all wall
24 spec in Yukon and the .60 wall spec in Northern British
25 Columbia. We would undertake to find out what the implica-
26 tions of the difference are and why there are the differences

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1 and provide that answer to you. I'm not personally familiar
2 with it at this point. There may be some particular reason
3 for the difference in pipe specification and I'm sure there
4 is and we'll undertake to find out what that reason is.

5 MR. BEANLANDS: Is it normal to
6 use .6 inch thickness walled pipe in more difficult pipe-
7 lining country?

8 MR. BOUCKHOUT: Mr. Elwood will
9 respond to the implications of wall thickness.

10 MR. ELWOOD: It wouldn't be
11 normal -- I don't think that's the correct word to use --
12 it does come to my mind that one thing that may be happening
13 here is perhaps Westcoast is using a different grade of
14 steel which would affect their wall thickness.

15 River crossings in general, have
16 heavy wall pipe and I know that is included in our design
17 as well, that the section under the river has heavy wall
18 pipe which is -- I believe it's 605 wall in our case.

19 MR. BEANLANDS: Do you know what
20 thickness of pipe they are planning to use on the Alaska end
21 of the proposed Alcan route?

22 MR. ELWOOD: No, I would have to
23 check that.

24 MR. BEANLANDS: Thank you.

25 MR. CHAIRMAN: Anymore questions
26 from the floor, comments? Would you like to sum up that --

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1 your first brief?

2 MR. McCANDLESS: Just a moment
3 please. Well, there is -- this brief originated for two
4 reasons. First, reading about pipeline rupture, forecasting
5 in the Northwest Territories and realizing that the volume
6 of gas escaping is very large. That is the chief environ-
7 mental concern I feel, concerning this proposal.

8 I'm arguing that the design should
9 be looked at with the idea of minimizing the risk of rupture,
10 minimizing the volume of the gas cloud which may escape.
11 Beyond that, I guess my conclusions -- I urge the Board to
12 review my conclusions at the end. I don't have anything
13 further to add there.

14 MR. CHAIRMAN: Okay, would you
15 like then to proceed with your second brief?

16 MR. McCANDLESS: Yes I will.

17 The second brief is 'Pipeline
18 Compressor Noise and Other Environmental Concerns'.
19 Foothills Pipe Lines (Yukon) Ltd. filed evidence in its
20 pipeline application, has several important deficiencies with
21 regard to compressor noise, blowdown and purging noise and
22 the use of water and methanol in hydrostatic testing of the
23 pipe.

24 While a pipeline decision lies with
25 the National Energy Board and the Government of Canada, who
26 may make various terms and conditions on construction and

1 operation, the Environmental Assessment Review Panel is
2 urged to consider the implication of these and other environ-
3 mental deficiencies in the Foothills' application and
4 recommend to the Minister that they are sufficiently large to
5 call into question, the credibility and sincerity of the
6 whole application.

7 Compressor Noise. In a detailed
8 paper accompanying this brief, I explain why I believe that
9 pipeline compressor noise may carry up to twenty miles from
10 the sites. The paper referred to here is entitled 'Pipeline
11 Compressor Noise in a Yukon Winter' and it was attached to
12 my submission to the Board.

13 I believe that Foothills must in-
14 stall sound attenuated equipment to reduce sound levels far
15 below those stated in their application and that the recom-
16 mendations regarding noise in the Mackenzie Valley Pipeline
17 Inquiry Staff Report of October, 1976, are applicable to the
18 Alaska Highway route.

19 I believe that compressor sound
20 will be reflected by a warm air layer during inversion con-
21 ditions that are typical in Whitehorse when the temperature
22 is minus twenty degrees celsius or colder. These inversion
23 conditions will carry the sound long distances so that it
24 will impinge on the environment over a large area.

25 At the worst case conditions of
26 extreme cold, wildlife must harbour its energy reserves.

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1 If compressor noise is overlain on ambient noise only in
2 these conditions, then animals must make some additional,
3 unusual response and therefore, use some incrementally larger
4 amount of their energy reserves. I am making the case here
5 for animals beyond the range of the intermittent noise corridor
6 of the Alaska Highway.

7 Secondly of course, the compressor
8 noise in cold weather will make a further encroachment on the
9 enjoyment of life and property by Yukon residents. I submit
10 that design for compressor station noise attenuation must
11 be based on the worst case situation which would appear under
12 very cold, still winter conditions.

13 Canadian Arctic Gas Study Ltd., has
14 made many studies on the effects of compressor noise. Using
15 electronic noise simulators, they have measured the responses
16 of animals such as snow geese, caribou and sheep. Probably
17 their studies are useful to environmental managers, but they
18 have only a limited -- they provide only a limited aspect of
19 the overall noise problem.

20 First of all, these studies took
21 place in summer or early fall over unfrozen bare ground.
22 Snow reduces normal ground absorption of sound -- I think
23 that's an error -- I'll read it anyway. Snow reduces normal
24 ground absorption of sound so that noise intensities at some
25 distance will be marginally higher than in summer.

26 Secondly, the animals tested may not

1 respond in quite the same way over -- under winter con-
2 ditions. Third, the equipment may not adequately reproduce
3 the full frequency spectrum of the compressor station.
4 Heavier equipment and more power would be needed to re-
5 produce lower frequencies. Lower frequencies may be much
6 more disturbing to animals than higher frequencies.

7 Finally, each report gave in-
8 adequate treatment to wind and temperature effects on prop-
9 agation. The Panel is advised that while Arctic Gas has
10 done at least three noise studies and incurred considerable
11 expense to do so, Foothills Pipe Lines (Yukon) has done
12 nothing except to say that the noise levels will be 80 dBA
13 at the fence limit. I submit that this is totally inadequate.

14 Pipeline and Station Blowdown.
15 During normal routine maintenance, portions of the gas system
16 must have their pressure reduced. The release of gas pro-
17 duces intense noise. The Mackenzie Valley Pipeline Staff
18 Report says that this noise may reach an intensity of 140
19 dBA which would be a million times more intense than the
20 station itself at 80 dB. Such noise levels may cause pain
21 and always damage hearing. The noise would appear as a
22 "sudden intrusion on the listener producing a widespread
23 change in body activity and perhaps impairment of hearing."

24 Normal maintenance procedures would
25 be -- could be modified to reduce the rate of pressure
26 release which would reduce the sound level. If Foothills

1 was to exhaust the full seventy-five miles of pipe between
2 block valves in order to make pipe repairs, blowdown noises
3 at extremely high noise levels might go on for hours. This
4 is completely unacceptable.

5 The Panel is urged to adopt the
6 recommendations of the Mackenzie Valley Pipeline Staff
7 Report on this subject. If anything, their recommendations
8 may be insufficient for inhabited or frequented areas along
9 the Alaska Highway.

10 Methanol Flushing and Purging.
11 After stringing the pipe but prior to use, the pipe is
12 hydrostatically tested with water over short lengths,
13 depending on the profile of the line. After testing, the
14 water is forced out ahead of a rubber ball or bladder driven
15 by compressed air. Next, methanol is introduced to absorb
16 the water remaining and to leave the pipe dry, ready to
17 receive gas. For each small section of pipe under test,
18 flushing with methanol continues until liquid methanol
19 appears at the test head.

20 Nowhere in its application and
21 evidence, does Foothills say what it plans to do with this
22 methanol after use. At the National Energy Board hearings
23 in Whitehorse, a Foothills representative admitted under
24 cross-examination, that it would be voided to the environ-
25 ment. Methanol is both poisonous and inflammable.

26 In the Mackenzie Valley Pipeline

1 Inquiry, much attention was paid to the recycling and safe
2 disposal of the methanol as indeed even to the water used
3 in the testing. The quantities of water and methanol
4 required are very large. Undertakings by Arctic Gas and
5 by Foothills Maple Leaf for the proposed Mackenzie Valley
6 pipeline have been left out of the Alaska Highway application.

7 I submit that this Panel examine
8 the Mackenzie Valley Pipeline Inquiry Record and the Staff
9 Report for recommendations on the use and safe disposal of
10 methanol for this pipe application.

11 My recommendations to this Panel
12 are:

13 (1) That compressor noise be
14 limited by the applicant to a maximum of 50 dBA at a point
15 fifteen hundred feet from the center of the compressor
16 site and that this condition be maintained at all seasons of
17 the year under all atmospheric conditions.

18 (2) That the applicant be
19 required to limit noise during blowdown or purging to those
20 levels set for the station noise and that only under con-
21 ditions of extreme duress, where there are dangers to
22 personnel or property posed by slow release, should these
23 noise levels be exceeded.

24 (3) At no time shall the applicant
25 discharge test water containing methanol unless the methanol
26 has been diluted to a proven non-toxic concentration and

1 such discharges of test water shall not disrupt natural
2 drainage to the point where fish and wildlife are adversely
3 affected.

4 I have one other point I would
5 add to my third recommendation and that is that the methanol
6 is actually used to dewater the pipe, so what I'm saying
7 here -- test water with methanol, that may be used in
8 permafrost areas because it's an antifreeze. But, they
9 have to use methanol in any case to reduce -- remove water
10 from the pipe.

11 That concludes my brief.

12 MR. CHAIRMAN: Thank you. Are
13 there questions from the Panel? Mr. Chambers?

14 MR. CHAMBERS: Mr. McCandless,
15 I was wondering where the information came from on the air
16 inversion and probably two related questions to it.

17 When you get an air inversion,
18 is this not related to ice fogging as well?

19 MR. McCANDLESS: No, the ice
20 fogging comes about because of very, very low temperatures.
21 The air will just simply not hold any moisture. It just
22 comes out, eh?

23 The problem is the temperature of
24 the ice fog doesn't really enter into it that much.

25 MR. CHAMBERS: Okay, I was
26 wondering -- the temperature of minus 20 degrees Celsius is

1 not a very cold temperature.

2 MR. McCANDLESS: No, that's not,
3 but the meteorologist, Mr. Herb Wallace, assured me that
4 starting at that temperature and colder, inversions are
5 very likely and that was what I -- his data was for minus
6 20 and that was the data I used in my other paper.

7 MR. CHAMBERS: So it's -- minus
8 20 degrees Centigrade is sort of a starting point of the
9 inversion that you're talking about, in colder temperatures.

10 MR. McCANDLESS: Yes.

11 MR. CHAIRMAN: Mr. Trevor?

12 MR. TREVOR: Just a point on
13 your first recommendation, Mr. McCandless. As I understand
14 the problems associated with inversion, there is sound
15 propagation and radio wave propagation can be transmitted
16 over fairly large distances and with -- how should I say
17 it -- no reliability is to the point where it strikes the
18 earth again so to speak.

19 Given that set of conditions, it
20 would appear that setting 50 dBA at fifteen hundred feet
21 may not adequately take care of a problem. You may be able
22 to get that level at that distance and yet have a higher
23 level at a greater distance. Would you agree with that
24 argument?

25 MR. McCANDLESS: That might be
26 possible. I guess it depends on the height of the inversion

1 layer above ground. In the other paper which I attached,
2 Figure 3, that is not to scale by any means, but I think
3 that you're right. A shadow zone might appear near the
4 station, but it's a function of how high the inversion
5 layer is.

6 MR. CHAMBERS: Thank you.

7 MR. CHAIRMAN: Mr. Chambers.

8 MR. CHAMBERS: In going through
9 your paper on the -- it was attached -- is there any evidence
10 of buffers that would help in cutting down the reflection of
11 your sound such as tree cover and so on? Or is this on
12 the research that was done here or the information that
13 you've got, taken as an open space area surrounding the
14 compressor station?

15 MR. McCANDLESS: Well, really
16 what I'm doing here is making a guess. I haven't allowed for
17 any attenuation through vegetation or terrain. I'm assuming
18 that it's flat and the other assumptions are set out.

19 MR. CHAMBERS: Yes, but in your
20 presentation, there is some comments about the variation
21 between the absorption rate of noise by snow cover and ground
22 cover, specifically with some of the research that was done
23 on it. I'm wondering in this case, tree is also a ground
24 cover and was there any research done that showed that there
25 was a cutting down of a noise affect by tree cover surrounding
26 compressor stations or their simulated compressor noise?

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1 MR. McCANDLESS: I'm sure that
2 studies have been done. That's about all I can say. I
3 haven't allowed for it here.

4 MR. CHAIRMAN: Mr. Wykes?

5 MR. WYKES: Mr. McCandless, you
6 suggested that the Mackenzie Valley Pipeline Inquiry Staff
7 Report on the noise levels they recommended for a pipeline
8 blowdown might not be sufficient.

9 Do you recall what those levels
10 were that they recommended?

11 MR. McCANDLESS: Well, their
12 recommendations for operating noise -- wait a minute --
13 could you rephrase your question? I think I lost it there.

14 MR. WYKES: For pipeline blowdown,
15 you recommended that the Mackenzie Valley Pipeline Inquiry
16 Staff Report suggested some numbers which you suggested,
17 could be used for this pipeline, however, they might be
18 insufficient for inhabited or frequented areas along the
19 highway.

20 What I was wondering is what the
21 levels were that that Staff Report recommended.

22 MR. McCANDLESS: Well, for
23 operating stations, they said 50 dBA at fifteen hundred feet
24 from the station and for blowdown, no higher than the noise
25 level for the operating station, because presumably, it
26 wouldn't be operating during blowdown, so that the noise from

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1 it wouldn't be particularly higher. But they did allow for
2 emergency conditions where the line had to be depressurized
3 in a hurry.

4 MR. WYKES: Thank you.

5 MR. CHAIRMAN: Any questions from
6 the Staff? Mr. Low?

7 MR. LOW: Yes, Mr. McCandless,
8 you in your report -- in your brief -- you state that some
9 twenty miles away from a compressor station, the noise could
10 be detected but you seem to imply that this could also be
11 a disturbance. Is that what you are implying?

12 MR. McCANDLESS: Yeah, that
13 twenty miles is unacceptable in my opinion. That's what
14 my --

15 MR. LOW: That would be during
16 the winter no doubt?

17 MR. McCANDLESS: Well, that's --
18 I'm saying that under inversion conditions, it might be
19 possible to hear a compressor station twenty miles. Now,
20 I'm just making a guess here and I'm putting in my reasons
21 for my guess, but that is assuming that Foothills' 80 dBA
22 at the fence limit isn't attenuated. If it's attenuated,
23 maybe it will be less.

24 MR. LOW: And was that applying
25 to just compressor station noise or blowdown noise?

26 MR. McCANDLESS: Both.

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1 MR. LOW: And Mr. Bouckhout, could
2 you give the Panel some information on frequency of blowdown.
3 Is it related to temperature or seasonal or could you make
4 some comments on that?

5 MR. BOUCKHOUT: Yes, we will
6 prepare statistics on frequency of blowdown from particularly
7 from existing systems and give you the rationale for blow-
8 down and timing and so on.

9 MR. LOW: And could you also
10 explain what measures could be taken to reduce noise levels
11 during blowdown?

12 MR. BOUCKHOUT: Yes, in fact, I
13 think sir, we could comment on that in a moment.

14 MR. LOW: All right, thank you.

15 MR. CHAIRMAN: Would you like to
16 respond, Mr. Bouckhout?

17 MR. BOUCKHOUT: Yes, Dr. Hill, I
18 do have a few comments. Firstly, we do have a small report
19 which unfortunately, checking your list, I note we haven't
20 filed and we will do so as soon as we get extra copies. I
21 have one with me and the report is entitled "Effects of
22 Weather and Terrain on Sound Transmission".

23 This report was prepared for us
24 by Western Research and Development Ltd. sometime ago and,
25 unfortunately, it must have been overlooked when we were
26 filing the reports with you.

1 A couple of points which are
2 relevant here, the sound levels at the fence line are pro-
3 jected to be and would be 60 dBA which equates to approxi-
4 mately 80 dB.

5 MR. CHAIRMAN: Phil, those of us
6 that aren't familiar with the difference between dBA and
7 dB, on the difference --

8 MR. BOUCKHOUT: dB decibels is
9 strictly a measure of pressure, whereas dBA is a measure of
10 sound in the audible range of frequencies. In other words,
11 a human audible range of frequencies. So they are two
12 different things. As a comparison which is perhaps relevant
13 here, the noise emanating from a noisy exhaust fan in a
14 washroom would equate to something in the order of 60 dBA.

15 We have done many measurements
16 in fact, we've also carried out measurements on existing
17 compressor stations for these various purposes as well.

18 With respect to the effects of
19 temperature and temperature inversions and this is contained
20 in the report which I've just mentioned. As I said, I would
21 file. The report states the temperature effects on sound
22 causing increase or decrease of up to only 5 dB. So this
23 gives you an idea of the effects of temperature or temperature
24 inversion on the transmission of sound.

25 Additionally with respect to blow-
26 down, in a controlled blowdown for which you evacuate your

1 system under controlled condtions, the sound can be and
2 generally is controlled by someone manually operating the
3 valve. In other words, it's not an explosive situation where
4 you get a sudden rush of noise. In a safety blowdown where
5 the system must be evacuated very rapidly for one reason or
6 another, the so-called sniffers in the compressor station
7 indicate that there is gas in the atmosphere or something
8 like that.

9 In that case, it must be evacuated
10 extremely quickly and that's one that is very difficult to
11 control in terms of noise because the -- and Mr. McCandless
12 has already pointed it out -- the objective is to evacuate
13 the system as quickly as possible. In the controlled blow-
14 down situation, it is controllable and is controlled by --
15 generally by manual operation of the exhaust valve -- the
16 blowdown valve.

17 With respect to methanol and I
18 think we discussed this very briefly yesterday, a great deal
19 of the efforts and consideration with respect to methanol
20 in the Mackenzie Valley systems, was related to the utiliza-
21 tion of a methanol water mixture for hydrostatic testing.
22 In other words, you tested with a gas water methanol -- or
23 a water methanol mix rather -- utilizing the methanol as a
24 freeze depressant in fairly large quantities since you're
25 testing very long sections. Then the implication was that
26 the disposal of this test medium -- the work done on methanol

1 in particular in the Mackenzie Valley was related to the
2 disposal of such a test medium. In other words, how do
3 you dispose of a twenty or thirty per cent methanol water
4 medium and that's what the bulk of the work in the Mackenzie
5 Valley was related to.

6 In terms of the utilization of
7 methanol for drying of the interior of the pipe, the way it
8 is done is the methanol is inserted in one end, behind a
9 sphere or between two spheres and pushed through the pipe.
10 As the methanol goes through it, it adheres to the interior
11 of the pipe. You don't utilize vast quantities for this
12 purpose. You're utilizing quantities in the order of perhaps
13 a barrel, a couple of barrels of methanol. You don't
14 necessarily get -- and in for say all cases, you don't get
15 that same quantity coming out at the distal end as it's
16 pushed through.

17 As I say, it does adhere to the
18 interior of the pipe. Additionally, when the methanol is
19 flushed through the pipe and exits at the distal end, it
20 can be collected and put into a truck or some other con-
21 veyance. It's not necessarily voided to the environment.
22 I'm not familiar with the reference that Mr. McCandless
23 mentioned that in all cases it would be voided to the
24 environment. The quantities as I said are quite small.
25 They're not very major quantities and there is no necessity
26 in most cases that even if it were large quantities, it is

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1 voided to the environment.

2 Perhaps Mr. Elwood could add just
3 a couple of comments for clarification.

4 MR. ELWOOD: There was just one
5 other comment that I wanted to make with respect to purging
6 the line. When you first put it into service or when you
7 subsequently, after you put it into service, again this is
8 a controlled situation. Gas is fed into one end of the
9 pipe and the air is vented from the far end of the pipe.
10 There is an operator standing there to manually control the
11 valve and it's not a noisy operation. This is done really
12 quite slowly to move the gas into the pipe and move the
13 air out so it's really not a noisy operation, involving --
14 in purging.

15 Noise levels are -- in all the
16 purging that I've been involved on, we were standing right
17 beside the pipe to carry on a conversation as the air is
18 coming out. It comes through in very small quantities
19 really.

20 MR. CHAIRMAN: Mr. Wykes?

21 MR. WYKES: Mr. Bouckhout, are
22 you in fact, planning to use methanol for absorbing the
23 water in the pipe?

24 MR. BOUCKHOUT: I'm sorry, Mr.
25 Wykes. Did you ask if we were using methanol to dry the
26 pipe? Yes, we would be. That's the current plan.

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1 MR. WYKES: You mentioned that
2 the methanol could be picked up at the other end of the
3 pipe and disposed of. What are your plans or do you have
4 any for the disposal of methanol?

5 MR. BOUCKHOUT: Well, this is
6 in its entirety, part of the detailing of the testing, the
7 entire testing procedures. It would obviously depend on
8 how much methanol was in fact evacuated. We would not void
9 methanol to the environment where the voiding of that
10 methanol would create an impact on the environment.

11 We would certainly not void
12 methanol into aquatic systems and so on either. If it were
13 deemed that where the methanol were to be voided and dis-
14 posed of that by doing so to the environment, would create
15 an impact, then certainly we would collect it and dispose
16 of it as necessary. It can be burned for instance or re-
17 cycled or whatever.

18 MR. WYKES: So really, you have
19 no plans as yet as to how you are going to dispose of the
20 methanol, is that correct?

21 MR. BOUCKHOUT: No, in terms of
22 the quantities we're speaking of, they are quite -- really
23 very small quantities. As I say, we're talking in the order
24 of tens of gallons and not in thousands of gallons and we
25 have no specific plans aside from utilizing the guidelines
26 which I've just mentioned.

1 MR. CHAIRMAN: Mr. Elwood? Oh,
2 sorry, Mr. Elwood.

3 MR. ELWOOD: Just further to
4 what Mr. Wykes was asking about. I could mention that the
5 normal practice on all pipelines that I've worked on is
6 to collect this methanol as it comes out the far end and
7 reuse it for the next -- for the drying of the next section
8 or when the testing procedure is done, it's generally
9 burned in a pit somewhere.

10 MR. TREVOR: Now, you've probably
11 answered the question I was going to put to Mr. Elwood, but
12 what in fact does come out at the other end -- a fifty-fifty
13 mixture or a sixty-forty mixture or what?

14 MR. ELWOOD: Now, you put in the
15 methanol in one end and push it through with a sphere and
16 if you get methanol out of the far end, that's what you get
17 -- methanol. If you don't get any, then you must -- then
18 you conclude that you have put in an insufficient quantity
19 and you go back to the other end of the pipe and put in
20 some more and push it through again until the interior of
21 the pipe is coated with methanol and the water has been
22 taken out by the process.

23 Once you get methanol coming out
24 the far end, and that's all you get out is methanol, then
25 your drying process -- your flushing is complete.

26 MR. TREVOR: All right. Perhaps

Mr. J. Elwood
Mr. B. Trevor
Mr. L. Bouckhout

1 you'd explain a little further then, just what is the
2 process. What happens to the water? I think people
3 here might appreciate hearing just how methanol removes
4 the water.

5 MR. ELWOOD: I'm not sure of
6 my chemistry here but as I recall now, what happens is that
7 the water is absorbed by the alcohol -- that there is some
8 chemical action there and once you get sufficient quantity
9 of this coming out the far end -- I suppose it could be
10 eventually, if there was sufficient water in the line, it
11 could be diluted to the point where what you were getting
12 out is a water methanol mix, but my experience has been
13 that really, it's mostly methanol, although it has absorbed
14 some water. I'm not sure of the chemistry on it, but I
15 know it does burn after our successful tests. So, there
16 can't be that much water in it.

17 MR. TREVOR: Thank you. Mr.
18 Bouckhout, going back to the question of decibels as opposed
19 to dBA, your explanation was that the dBA was a reading
20 taken over a normal hearing range, is that correct?

21 MR. BOUCKHOUT: That's right.
22 It's taken over --

23 MR. TREVOR: Whose hearing range
24 -- the human being or --

25 MR. BOUCKHOUT: Human hearing
26 range -- dBA.

1 MR. TREVOR: You would agree
2 would you not, that this could be entirely different for an
3 animal?

4 MR. BOUCKHOUT: Certainly, there
5 is a possibility.

6 MR. TREVOR: Have any tests been
7 done in this regard as to what the effect -- what different
8 levels it might have an effect on different species of
9 wildlife?

10 MR. BOUCKHOUT: To my knowledge,
11 aside from the simulation tests which were conducted
12 relative to the effects of compressor station on caribou
13 and so on, which were mentioned by Mr. McCandless and which
14 were in fact, supported by Alberta Gas Trunk Line at the
15 time as well, there haven't been any particular studies
16 undertaken.

17 I think there have been efforts
18 on an academic level to work on these kinds of things but
19 I'm not sure if the results have been very convincing.
20 What we can operate on is again, relating to experience with
21 currently operating stations and so on and that's about all
22 we can relate to in that respect.

23 One additional thing Mr. Trevor,
24 if I may, I'm not sure that it has been made clear that the
25 methanol is used after the test water has been extracted
26 from the pipe. In other words, the methanol is not pushed

1 in between a sphere right behind all the test water. The
2 test water is bled off the pipe. The methanol is then used
3 after that process to conduct the final drying of the pipe
4 and any water that is still within it.

5 MR. TREVOR: Yes, I'm aware of
6 that, but as I understand it, there could be quantities of
7 water in those sections which are not removed entirely by
8 the previous process. Isn't that correct?

9 MR. BOUCKHOUT: Well, there could
10 very well be. What in fact happens is, your sphere -- your
11 initial sphere pushes the water ahead of it -- in front of
12 it, whether there is water still lying in any depressions
13 in the pipe, your initial sphere is pushing the water ahead
14 of it to evacuate it. The methanol is then behind that
15 sphere.

16 MR. TREVOR: Yes, but the first
17 process doesn't remove all the water, correct?

18 MR. BOUCKHOUT: Does not remove
19 all the water?

20 MR. TREVOR: That's the reason
21 why you use the methanol?

22 MR. BOUCKHOUT: That's right.
23 That's correct.

24 MR. TREVOR: Okay, well what I'm
25 trying to get at is what quantities of water might be
26 left, resulting in the methanol injection not being able to

1 take care of all the water that was present? Is this a
2 problem or not? Are we just talking about a small quantity
3 of water, that the pipe is essentially only wet or are we
4 talking about areas where, because the pipe is in a lower
5 lying place, there might be an accumulation of water that
6 could not be removed by the pushing through of the sphere.

7 MR. ELWOOD: My personal experience
8 with testing, Mr. Trevor, has been on lines up to and in-
9 cluding thirty-six inch and the quantity of fluid that
10 came out with the methanol flush was a few barrels.

11 We had a tank truck or some forty-
12 five gallon drums there to collect it. I don't recall the
13 exact gallons or barrels that did come out but it was less
14 than one truckload.

15 MR. TREVOR: And your experience
16 was basically that that material was either reusable or
17 could be burnt off?

18 MR. ELWOOD: Yes.

19 MR. TREVOR: Thank you.

20 MR. CHAIRMAN: I have one question
21 about the matter of inversions. You mentioned that your
22 report indicates that there is a ten per cent increase in --
23 possible ten per cent increase in noise levels because of
24 inversion. I was wondering if this was because of the
25 density of the air or did it take into account, the
26 reflection aspect that was outlined in Mr. McCandless' brief?

Mr. L. Bouckhout
Mr. J. Theberge

1 MR. BOUCKHOUT: I think, Dr.
2 Hill, what I indicated was that it was a 5 dB change, not
3 a ten per cent, 5 dB.

4 MR. CHAIRMAN: All right.

5 MR. BOUCKHOUT: The report with
6 respect to temperature and there is in fact, a diagram
7 accompanying it, appears to take into account deflection as
8 well as density of the air.

9 MR. CHAIRMAN: Thank you.
10 Are there comments or questions from the floor? Yes? Would
11 you identify yourself please. Would you use the microphone?

12 MR. THEBERGE: John Theberge with
13 Yukon Game Branch. Could I ask Mr. Bouckhout -- in the
14 hydrostatic pressure testing which is done with water, is
15 the entire volume of the pipe filled with water?

16 MR. BOUCKHOUT: John, the way it
17 is done is the pipe is tested in sections. The entire pipe
18 is not tested at once. It's done in sections which may be
19 up to three to five miles at a length and when you are
20 testing those lengths, the entire pipe or the entire internal
21 volume of that length is filled in order to bring up the
22 pressure.

23 MR. THEBERGE: And then what
24 happens with that water? Is it voided to some aquatic
25 system in some controlled way?

26 MR. BOUCKHOUT: There are several

1 options, John, in terms of what happens to the water. It
2 can be voided to a standing water body to a muskeg area to
3 a drainage system or it can be reused to test the next
4 section, which is also done. The water is -- once the test
5 is completed in one particular section, the water is pumped
6 out of that section to the next test section and reutilized
7 for the testing of the next section.

8 MR. THEBERGE: But eventually,
9 when it's disposed of, you would have some standards or
10 some procedures would you, to make sure that you didn't
11 alter an aquatic system that it's flushed into?

12 MR. BOUCKHOUT: Yes. In terms
13 of ultimate disposal of the water back into the environment,
14 there would be guidelines established on that similar to
15 the guidelines which were established on the original source
16 of the water. That disposal sites and source sites would all
17 be investigated by biologists and identified as being suitable
18 as disposal sites or not used.

19 In other words, any disposal site
20 which is selected would have been previously investigated
21 for that purpose.

22 MR. THEBERGE: Thank you, Mr.
23 Chairman.

24 MR. CHAIRMAN: Are there any
25 other comments or questions from the floor?

26 Mr. McCandless, would you like to

1 make any further comments?

2 MR. McCANDLESS: I have one other
3 comment. I believe it was Mr. Bouckhout said that 80 dB at
4 the fence is equivalent to 60 dB on the A-rated scale.

5 I'm not so sure about that because
6 it seems to me that the noises from these compressor stations
7 are by and large, in the audible range. As I understand
8 the A-scale, there is certain balancing to duplicate the
9 human ear. Our ears can pick up some frequencies more
10 easily than others, but a jump of about a hundred times in
11 pressure intensity, I find that somewhat hard to understand,
12 because that's what he's saying. That the actual pressure
13 on the eardrum so, is one hundred times less if you go to
14 the A-rated scale.

15 The other thing, if Foothills has
16 a study on atmospheric effects of sound propagation, could
17 I ask the Board to be provided with a copy of that report,
18 once the -- the Panel -- once the Panel has received that
19 report, so that I might consider it and possibly respond.

20 I can't see -- he says a 5 dB
21 increase as a result of inversion. That is meaningless. It
22 doesn't say anything about the distance or what inversion
23 conditions he's talking about or anything and I feel that
24 I'd like to respond if he's got a study on it.

25 My reason for saying that is that
26 there is just about nothing in the literature on inversions.

Mr. P. McCandless
Mr. L. Bouckhout

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1 The only paper I was able to find, I have referred to, and
2 I suggest that possibly this Panel should contact Dr.
3 Embleton(?), mail him a copy of what I have written and ask
4 him for his comments.

5 MR. CHAIRMAN: Thank you.

6 MR. BOUCKHOUT: Just a couple of
7 comments in terms of your response, Mr. McCandless, relative
8 to the dB. In fact, as I stated and I'll state it once
9 more, what the report in fact says which of course, you will
10 obtain a copy of -- is the temperature affects on sound,
11 cause an increase or decrease of up to 5 dB. That's in
12 fact, the direct quote from the report. It will be made
13 available.

14 With respect to your comments on
15 the relevance of 60 dBA to 80 dB, I really can't comment
16 professionally on it because I'm not really that familiar
17 with sound levels. That's been my understanding and as
18 other people have told me, that that is a relative equivalent of
19 reasonable levels.

20 Now, that is the basis of my
21 statement.

22 MR. CHAIRMAN: But, yes, we will
23 make a copy available to you when we receive it.

24 Thank you very much then for your
25 two briefs. Next, we have the -- is Mr. Neil Olsen here
26 from the Haines Junction Businessmens' Association? Would
you please give your brief now?

1 MR. OLSEN: I think before I
2 start, a few words of explanation are in order.

3 The briefs that I have here, I
4 believe you have on file too? Yes, thank you. Originally
5 it was written about three months ago at our Business
6 Association and it was designed to be presented to the
7 Territorial Council. Anyway, by the time we got it typed,
8 the Lysyk Inquiry was on us and so it was presented to the
9 Lysyk Inquiry. So, that's why it is stated as such. I'm
10 sorry about the thing on the first page.

11 Myself, I'm the vice-president,
12 Anyway, at the Lysyk Inquiry some of the criticisms of the
13 pipeline prompted me to write some further information which
14 I have here, and it's not typed yet and you won't have it on
15 file, but I wonder if I could give it today and I can mail
16 you -- I'll have it typed and mailed to you.

17 MR. CHAIRMAN: Okay.

18 MR. OLSEN: I should also say
19 before I start, that the first brief really, as you can see,
20 was designed to be presented to the Territorial Council and
21 being this Environmental Assessment Panel, it's not all that
22 pertinent, but there's a few major points in here I think
23 bear worthy consideration. Without further ado I'll get into
24 it.

25 The history of Haines Junction
26 business development is recent. In 1946-47 the first business

1 establishment was built, primarily to provide services for
2 tourists, bus passengers, roving highway maintenance crews
3 and land pipeline maintenance personnel. The only people
4 living in the Junction at that time were eight to ten
5 Canadian Army Highway personnel, a small staff at the
6 Government Experimental Farm at Mile 1021 as well as one or
7 two R.C.M. Police Officers and a Forest Warden.

8 In 1949-50, the first store was
9 built to provide services locally and the other north highway
10 and Haines Road communities. Businesses developed servicing
11 a fire prevention centre for Kloo Lake, Aishihik, and the
12 Haines Road. All business people were responsible for
13 providing their own power, water, sewer and other services.

14 The first major change came in
15 1954-55 with the construction of the Haines-Fairbanks eight
16 inch Multi-products pipeline. Construction began in 1954 and
17 was completed in September of '55. A pumping station was
18 built at Mile 1026 with seven to ten permanent Canadian
19 employees, all Yukoners. Stations were also built at Mile 48
20 on the Haines Road and Mile 1124 on the Alaska Highway,
21 approximately 400 contractor personnel were employed plus
22 U.S. Government Inspectors and military personnel.

23 Haines Junction's businessmen
24 responded to the needs of the pipeline construction and the
25 increased tourist traffic, and the Junction became a viable
26 business community with enough people to have reasonably good

1 social activities and recreation facilities which in turn
2 encouraged a few more permanent residents. Yukon Electric
3 was given a power franchise for Haines Junction.

4 In the late 1950's, Alaska
5 Yukon Refiners constructed a small refinery at Haines
6 Junction with the prime purpose of providing products for
7 the highway paving program. They also built a bulk storage
8 plant at Mile 1024. Gasoline and diesel were hauled from
9 Haines, Alaska, for distribution throughout the Yukon. The
10 refinery operated for one year, and the bulk plant closed in
11 1975. The Dominion Experimental Farm increased its personnel
12 and administrative headquarters and government in general
13 began to upgrade their agencies. These activities and the
14 C.N.T. Micro-wave really established Haines Junction as an
15 active service centre with a health centre, a good school and
16 other facilities. Housing for native people from Kloo Lake
17 and Aishihik was built. In 1963, the Haines-Fairbanks pipe-
18 line at its present site, built three additional pumping
19 stations; one at the Haines Road, Mile 96, on the Alaska
20 Highway at 1083 and 1204. Once again, six to seven Canadians
21 were hired at each station on a permanent basis. For the
22 remainder of the 1960's relatively slow growth occurred
23 mostly by government in a new school and the community club.
24 They built a large community hall in 1966-67 as a centennial
25 project.

26 The growth of the community

1 indicated the necessity for an active form of local govern-
2 ment and the Advisory Committee established in 1966 was
3 replaced by the first Local Improvement District in 1969.

4 During the late 1960's and early
5 '70's, two events occurred that shook Haines Junction and
6 had a serious effect on the north highway as well. The
7 Canadian Government decided to close the Experimental Farm
8 and the American Government shut down the Haines-Fairbanks
9 pipeline. The local community had no control over either of
10 these events. Fortunately, in 1972 the Kluane Game Reserve
11 was established as Kluane National Park. Parks Canada took
12 over the old Experimental Farm and once again gave Haines
13 Junction a base to grow from. Kluane Park at present has
14 approximately twenty-seven employees in the Junction. I
15 should interject here that of those twenty-seven employees,
16 I believe all but four or five were hired from the Yukon and
17 the rest came from Outside. A new sub-division was established
18 to accommodate Government and private housing. The necessity
19 for housing required that we have a sewer and water system.
20 These were established in 1974, 5, and 6.

21 The Aishihik Power project also
22 had a marked economic effect on Haines Junction, both in
23 employment for local residents, workers at the project
24 living in Haines Junction, and the many employees that came
25 to the town for social and recreational activities.

26 This short resume of Haines

1 Junction's development is presented to show that we have had
2 our ups and downs as we have developed. It should also
3 indicate that we are aware of the effects of major construc-
4 tion projects and are capable of making a sound and rational
5 assessment of the effects a project such as the Alcan pipeline
6 would have on our community and the Yukon Territory.

7 Route Selection. Foothills'
8 pipeline proposal through the interior of the Yukon, closely
9 following the Alaska Highway appears to be the logical route
10 if a pipeline through Canadian territory is to be granted.
11 A sound transportation corridor has already been established
12 through the interior and a pipeline closely following this
13 corridor appears a natural route selection. A small multi-
14 products pipeline was constructed from Watson Lake to
15 Carcross, closely following the Alaska Highway. The four
16 inch crude line followed the Alaska Highway from Johnson's
17 Crossing to Whitehorse. The three inch diesel fuel line was
18 constructed from Whitehorse to the border at Beaver Creek.
19 The eight inch multi-products pipeline closely followed the
20 Haines Road to Haines Junction and then to Beaver Creek.
21 While the first three above-mentioned lines have been removed,
22 it would be difficult today to identify the right-of-way that
23 these lines followed because of brush growth. While these
24 lines were all surface pipe lines, they still required one
25 hundred to two hundred foot easements. The construction of
26 a forty-eight inch buried pipeline would certainly disturb

1 the landscape in a much more evident manner and the scars
2 left by excavation would certainly be noticeable for several
3 years. However, experience has shown that the re-growth
4 through the proposed route would be quite rapid. In the
5 case of the surface pipelines it was necessary to constantly
6 remove undergrowth of trees in order to provide access to the
7 pipeline route for maintenance purposes. I would interject
8 here once more on what this was all about. The U.S. Army who
9 owned the pipeline would fly the -- had a contract to fly
10 the pipeline twice a week, looking for oil spills and they
11 had to -- about every three or four years they had to remove
12 the brush with herbicides in order that they could keep on
13 inspection of the pipe, so the pilot could see it from the
14 air. Our observation of other pipeline routes used previously
15 would indicate that the right-of-way through the Territory
16 requested by Foothills would not permanently scar the
17 landscape.

18 Environment. There is no
19 question but that the clearing of a pipeline right-of-way,
20 the subsequent excavation, laying and recovering will have an
21 effect on the environment. The issue is whether the benefits
22 to Yukon communities outweigh the overall impact of
23 environment change, and whether the environment damage caused
24 would be permanent.

25 We have a good, if not exact,
26 comparison in the Alaska Highway. We find it difficult to

1 believe that the pipeline corridor proposed by the applicant
2 would disrupt the environment as much as the Alaska Highway
3 did or has.

4 We would suggest that the
5 benefits of an assured gas supply, plus employment opportuni-
6 ties, tax benefits to the territory and the additional perma-
7 nent residences in many small communities would compare
8 favourably with the Alaska Highway. We feel that those
9 people who have to work with the Department of the Environment
10 officials with their regulations and restrictions would
11 follow the rules, and as well with any other guidelines that
12 would be required in order to keep environmental damage to a
13 minimum.

14 During the construction of the
15 Haines-Fairbanks pipeline, there was little concern for
16 environmental damage during this construction period.
17 Canadian authorities exercised considerable surveillance
18 over the contractor, but nothing in comparison to the
19 environmental regulations we have today. We feel relatively
20 secure with the knowledge that we have had the opportunity
21 to observe pumping stations on the Haines-Fairbanks pipeline
22 and that we are not aware of any disruption to the wildlife
23 because of pumping station noise levels. Indeed it was
24 necessary to build six foot chain line fences in order to
25 keep the bear, moose and smaller animals out of the
26 industrial areas.

1 The fact that the proposed
2 pipeline is buried would have no effect on the migration
3 pattern of animals other than possibly through the construc-
4 tion period.

5 We would expect that in any
6 known area where wildlife would be seriously effected or
7 endangered that the applicant would not be allowed to locate
8 buildings or permanent facilities. In our particular area,
9 we are not aware of any such problems.

10 I would like to add that later
11 on that there is one that I thought of, it sort of contra-
12 dicts that statement. I'll get to that later.

13 We feel that because the pipeline
14 is designed to carry natural gas, any possible damage caused
15 by acts of God, or natural causes would not seriously
16 effect the environment in comparison to the damage that a
17 crude oil or multi-products pipeline would create under the
18 same situation.

19 Employment and Services. We
20 would expect that Yukon residents should be given first
21 opportunity for employment in all areas where they could meet
22 the requirements and qualifications. We would expect that
23 the definition of a Yukoner be based on some type of
24 residency qualifications such as being able to vote in a
25 Territorial election. We would also expect that all fuels,
26 and oils used by the contractor would be purposed through

1 Yukon distributors of petroleum products and subject to the
2 same taxes as any other contractor in the territory.

3 The Haines-Fairbanks pipeline
4 employed local Yukon personnel as petroleum pipeline pump
5 operators, powerhouse operators, mechanics, welders, equipment
6 operators, et cetera. We have established that they chose
7 personnel that had a mechanical or equipment qualifications
8 as trainees and that this system provided permanent employment
9 for over forty Yukon residents. Only personnel with
10 specialized maintenance qualifications, instrumentation, et
11 cetera, were hired outside the territory, or they were
12 Americans hired by the U.S. Army. W

13 We would reasonably expect that
14 the applicant with the lead time indicated by the construction
15 period could provide the necessary personnel compliment to
16 operate compressor stations and related duties. We would
17 readily agree that all supervisory and technical staff
18 requirements may have to be filled from outside the territory.

19 We have been assured by the
20 applicant in Information Sheets 1, 2, and 3 that these
21 opportunities and other benefits will be given to Yukoners.
22 The program outlined through Notran indicates that Yukoners
23 will have ample opportunity to benefit according to their
24 merit and performance.

25 Community Benefits. Past
26 experience with previous projects have had very little

1 detrimental effect in our community's social or recreational
2 activities. Indeed in any instances they provided many
3 benefits because of the good public relations of the
4 employers and the employees concerned.

5 I would interject here once
6 again, and -- the U.S. Army installations often helped
7 building community clubs and skating rinks and so on.

8 In almost every instance these
9 projects brought more services to the community, such as
10 health stations, additional schooling, business opportunities,
11 more permanent residences and finally water and water and
12 a new sub-division. Our business establishments look forward
13 to providing as many of the services as possible within
14 our limitations in order to accommodate personnel involved
15 in its project.

16 Should Foothills' application
17 be approved, our area is scheduled for construction during
18 the summer of 1979. We have been encouraged by Foothills'
19 policy of using local business outlets wherever possible
20 and we feel that with consultations with Foothills, the
21 possible potential areas for business opportunities can be
22 established. We feel that the eighteen month lead time
23 indicated will give our businessmen a sufficient time to take
24 advantage of these opportunities and to develop and expand
25 according to their own wishes.

26 We feel that with the job hiring

1 policies, if followed as outlined by the application, that
2 the effect on our community by in-migration should be kept
3 to a minimum.

4 The company's stated policy of
5 workers in self contained camps well removed from communities
6 with their own facilities should assist in controlling our
7 alcohol problems. We would agree with this proposal and
8 encourage its establishment.

9 We would welcome the additional
10 twenty-two permanent residents to our community. We are in
11 accord with the company's stated policy of locating its
12 permanent employees in the nearest community
13 if the community is in agreement. We could reasonably
14 expect that the Government of the Yukon would respond to the
15 needs of the increased population possibly allowing for
16 schooling up to Grade Twelve (Grade Ten at present).

17 I will interject here once again
18 and speak as a member from outside Whitehorse. We only have
19 Grade Ten in Haines Junction, and as is true in a lot of the
20 outside communities, I don't mean to advocate we want
21 Haines Junction to grow to five or ten thousand people or
22 anything, but the problem is that the Grade Ten maximum breaks
23 up a lot of families, and they cause a lot of people to leave
24 the communities because they want to supervise their children
25 at a time when they probably need it a lot. This has always
26 been a problem in areas outside of Whitehorse. At present I

1 believe if they had Grade Eleven or Twelve, they would only
2 have six or seven students, and it doesn't justify the
3 Territorial Government spending a whole bunch of money
4 building a school with lab facilities, et cetera, for a few
5 students.

6 Possibilities of a new cottage
7 hospital, new postal facilities and other amenities would
8 result from a larger permanent population. No doubt
9 additional business would develop, enabling local residents
10 to be less dependent on the main centre of business which
11 is Whitehorse.

12 Economics. One area of concern
13 here is the possibility expressed by Foothills that
14 Haines Junction is too far, that is three miles, from the
15 main line to make it economical to provide natural gas to
16 the community. We would hope that the company will take
17 another look at this community and provide natural gas when
18 the pipeline becomes operational.

19 Foothills Information Sheet
20 Number Fifteen, dated 15th April, '77, indicates savings in
21 annual fuel costs by using natural gas over diesel fuel of
22 \$183.00 in Whitehorse to \$519.00 annually in Watson Lake.

23 If I can interject here once
24 again, if it's \$519.00 in Watson Lake, it would be about
25 five thousand to me.

26 It seems reasonable that Haines

1 Junction would also have the benefits of a secure and
2 cheaper fuel supply. One of our main reasons for supporting
3 the applicant's proposal is that natural gas would be
4 available to many communities in the Yukon. At present we
5 have fuel oil as our main support for home heating, and at
6 present we pay seventy cents a gallon. Electricity is also
7 very costly and propane is \$20.00 per hundred cubic feet.
8 Natural gas would give us an assured supply of home heating
9 fuel that is cheaper than any presently available in the
10 Yukon. It seems peculiar that in a situation where energy is
11 becoming more expensive; indeed at present there is a - at
12 the present time there is a real or at least a future energy
13 crisis, that there are proponents dedicated to the comfort
14 of wildlife while we are uncomfortable in our homes.

15 The availability of an assured
16 source of fuel would enable many more areas of the Yukon to
17 encourage light industrial activities in their communities,
18 thus providing employment opportunities for our residents.
19 We now rely mainly on seasonal type of employment for a great
20 many residents. The present electrical equalization rebate
21 distributed to Yukon residents by the Territorial Government
22 is forecast to last for one or two more years. This statement
23 was made by the Yukon Territorial Government, and at present
24 no alternate source of funding is available. This fund allows
25 businessmen a fifteen per cent reduction in electricity and
26 provides the householder in his area with a rebate of

1 approximately thirty dollars a month.

2 The possibility of obtaining
3 natural gas at rates comparable with southern Canada would
4 be of tremendous economical benefit to a large percentage of
5 Yukon residents.

6 The applicant has estimated that
7 taxes would accrue to our various government agencies would
8 be close to three million dollars a year. Such a source of
9 reliable income cannot but be of benefit to our government
10 and it's people. We would recommend that the Government of
11 Canada, the Government of Yukon, and the applicant give
12 consideration to establishing a co-ordinating committee that
13 would look in to all aspects of the Haines Road-Alaska
14 Highway paving program and the Alcan pipeline program. The
15 benefits of such a committee would be of major importance if
16 these two projects should happen to coincide. That is the
17 construction happening at the same time. We're a little
18 worried that there is no communication within the government
19 agencies that will -- it will complicate things and create a
20 lot of disorganization and malcontent.

21 The highway program scheduling
22 has not been made public at this date. Foothills schedule
23 has been forecast by the application. It would appear that
24 the summer of '79 is scheduled for the Burwash to Champagne
25 area and would be completed by October '79.

26 We would hope that this particular

1 section of the highway is not scheduled for major relocation
2 or construction in the same year. We feel certain that the
3 activities of these two projects could be so controlled as
4 to cause the least possible demand for additional services
5 in the same construction season. The many activities of the
6 various government agencies and the applicant should have
7 absolute priority of programming and planning, particularly
8 in the Haines Junction and the north Alaska Highway.

9 Local Improvement Districts
10 should also become involved in order that the local govern-
11 ment can have input in areas of concern to their community
12 and it's residents.

13 In our view, one of the main
14 areas of concern would be ensuring that the proper planning
15 had been accomplished in co-ordinating the activities of so
16 many government agencies.

17 Some individual is going to have
18 to be appointed with authority for an on the spot decision
19 and to have complete jurisdiction over the Yukon Territorial
20 Government, the Government of Canada, and the agencies and
21 employees.

22 Conclusion. Mr. Chairman, members
23 of the Board, we have to the best of our ability weighed the
24 pros and cons of the applicants proposal. We have looked at
25 the possible damage to our landscape, our community, its
26 environment and its people.

1 We have come to the conclusion
2 that the benefits this territory would derive from the
3 availability of natural gas would far outweigh any danger
4 to our environment or inconvenience to our people. To
5 communities such as ours, it would give us an equal
6 opportunity to develop as we wish, to provide a sound
7 economic base for all our people. We would also continue
8 to look forward to be able to live in the Yukon as is our
9 choice, a situation that will not continue if we are faced
10 with the increasingly high costs of diesel fuel and electricity.

11 We feel confident that the
12 Government's of Canada and the Yukon Territory will ensure
13 that damage to our environment will be kept to a minimum.
14 We also feel that the Alcan route would cause less environ-
15 mental damage than any of the other routes so far proposed,
16 insofar as that corridor has already been established.

17 We therefore would add our support
18 to the applicant's proposal to build a natural gas line
19 following the proposed Alaska Highway route.

20 With all the evidence of ill
21 effects recently expressed by anti-pipeline supporters, we
22 feel that the north Alaska Highway is a unique area to
23 examine the validity of such arguments. We have had a
24 pipeline. It and it's pumping stations are still there. We
25 know of no serious damage to wildlife, ecology, or ill human
26 social effects from the Haines-Fairbanks pipeline. The

1 economic advantages during and after the construction were
2 tremendous. It's shutdown was a serious loss of payroll in
3 our community.

4 MR. CHAIRMAN: Thank you very
5 much. I see it's near lunch time. I would like to make a
6 couple of announcements before we break for lunch and then
7 we'll reconvene at one thirty.

8 For tomorrow, instead of
9 having the morning session, we will begin at one thirty in
10 the afternoon and have an evening session. The evening
11 session, we'll consider the briefs of the Yukon Conservation
12 Society and the Game Branch.

13 I also notice that we're having
14 a little trouble scheduling some of the briefs on Friday.
15 Some of the government agencies wish as much time as possible
16 to prepare their briefs, so we're having a little trouble
17 scheduling at the end of the week, and I'll make a further
18 announcement as we make a decision on that schedule.

19 Also, today, we'll consider after
20 Mr. Olsen's brief, we'll consider Mr. Morlan's brief and then
21 we will have completed the briefs for today, because Mrs.
22 Ernie Watson will be rescheduled to another date.

23 As a consequence after the panel
24 have a number of questions that they would like to put to
25 Foothills and we have arranged for them to do so this afternoon
26 after the briefs are completed during the normal hearing hours.

1 So could we now break for lunch
2 and reconvene at one thirty.

3 (PROCEEDINGS ADJOURNED)

4 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

5 MR. CHAIRMAN: Okay, well, I
6 would like to further the announcement about the scheduling
7 of hearings. We have decided not to hold hearings on
8 Thursday because of the unavailability of the later
9 participants to appear on Thursday. They all wish to appear
10 on Friday, so we won't be holding hearings on Thursday unless
11 we have a run over from Wednesday evening.

12 Okay, shall we continue. Does
13 the panel have questions of Mr. Olsen? Maybe we can continue
14 with other questions. Does Foothills -- or does panel's
15 staff as well have questions? Ms. Archibald?

16 MS. ARCHIBALD: Your second last
17 sentence in your brief says: "We know of no serious damage to
18 wildlife, ecology, or ill human social effects from the
19 Haines-Fairbanks pipeline."

20 Were any studies actually done
21 before and after the pipeline was built?

22 MR. OLSEN: Not as far as I know.

23 MS. ARCHIBALD: I have just one
24 other question. Tourism must be a fairly important industry
25 in Haines Junction, is that correct?

26 MR. OLSEN: Well, I would say it's

1 about fifty per cent of the business. It's servicing lots of
2 things besides tourism - government and tourism.

3 MS. ARCHIBALD: Do you foresee
4 any conflict between the tourist industry in Haines Junction
5 and the pipeline construction activity?

6 MR. OLSEN: No, well maybe --

7 MS. ARCHIBALD: What about the
8 aesthetics of it?

9 MR. OLSEN: -- the -- I suppose
10 in the year that it's under construction, perhaps, with the
11 increased highway traffic. That sort of thing, yeah.

12 MS. ARCHIBALD: That's all the
13 questions I have.

14 MR. CHAIRMAN: Mr. Low?

15 MR. LOW: There seems to be
16 a construction camp located quite near Haines Junction. Do
17 you think that will have any effect on your community?
18 Dilaterious effects?

19 MR. OLSEN: Well, there is concern
20 that the influx of large numbers of construction workers would
21 bother parents of young teenagers, girls particularly. But
22 Foothills -- and the other thing is there is concern about is
23 that the, particularly to the business people and the land
24 owners, that if the camp sort of surrounded the town or was
25 even close to the town, they might make demands on sewer and
26 water systems, electrical demands that would necessitate

1 further burden on the taxpayer. So one of the things that we
2 feel -- one of the things that we particularly like about the
3 Foothills' proposal is that the camps would be away from the
4 communities and that they would provide all their own services,
5 including taverns so that this sort of effect would still be
6 there, but it would be minimized this way. Especially if it
7 was say thirty to fifty miles away from the community.

8 MR. CHAIRMAN: Mr. Wykes?

9 MR. WYKES: Mr. Olsen, in your
10 brief you mentioned that with the Haines-Fairbanks products
11 pipeline, you were going to mention one particular problem
12 with wildlife at a later stage. I wonder if you would mention
13 that one now.

14 MR. OLSEN: Yeah, I get to it
15 here in my second thing. But I can mention it now.

16 It is that I was a biologist on
17 Sheep Mountain for two years, which is at Mile 1064 and it
18 occurred to me that being as it's along side the lake and
19 they're going to bury the pipeline, I'm not familiar if they
20 are around there or not, but if they do, that would necessitate
21 a lot of blasting because there's deep rock blocks around
22 about a quarter mile section. This is also the sheep's main
23 winter range.

24 But the thing is so long as --
25 all I was recommending is that if it was done in the summer
26 time in the mid-summer months, it wouldn't bother the sheep

1 because they are not there. They are only there in the
2 winter months. Like if it was done in the wintertime, you
3 know, there would be quite an amount of banging away and it
4 might hurt somebody or something.

5 MR. SCHILDER: Mr. Chairman, I
6 have one question for Mr. Olsen.

7 On page three of brief you made
8 a statement that your community have a sewer and water system
9 which was established between 1974 and 1976. Over on page
10 nine you also indicated that among the community benefits
11 that you expect that finally water and sewer and a new
12 sub-division would come. It looks like a small contradiction.
13 Perhaps you could explain that please?

14 MR. OLSEN: On page 9 should
15 read water and sewer in a new sub-division.

16 MR. SCHILDER: I see.

17 MR. OLSEN: Because what is
18 happening is with the increase of personnel with Parks Canada,
19 there is need for a new sub-division, however, the Federal
20 Government's not going to go ahead with that proposal unless
21 there is -- a sub-division means fifty lots. They're not
22 going to do it for five or six.

23 MR. SCHILDER: In that case I
24 would like to leave to ask you a supplemental question. I noticed
25 of course that you are representing the business community or
26 the Businessmen's Association, however, in view of the expected

1 need for greater services and water and sewage in your
2 community, there may be a greater pressure on taxpayers
3 pockets and perhaps it's not fully within the line of
4 environmental assessment, but it may be something which the
5 residents certainly would like to hear about it. What would
6 be your opinion about that? Would it be interpreted as being
7 part of the pipeline or --?

8 MR. OLSEN: Well, we don't
9 approve of the construction camps being in the community,
10 creating terrific demands and then leaving us with the bill.
11 I want to make this quite clear, I guess we should have stated
12 it a little bit better, but the reason why we presented this
13 thing to begin with was not because being businessmen
14 obviously we're going to make a couple of bucks in the first
15 two or three years, whenever the pipeline is under
16 construction. This doesn't justify, however, borrowing money
17 at today's interest rates over twelve, fifteen years. So our
18 main reason for advocating this is that we are looking
19 towards the sound basis of twenty-two more families that's
20 in the applicant's proposal to give us the economic base to
21 increase the school service. Particularly the school service
22 to the residents. The new sub-division that would be needed
23 is needed partly by Parks Canada, but would be needed mainly
24 by the pipeline personnel and in which case development of
25 the new sub-division, I believe the estimate is six thousand
26 dollars a lot and that includes sewer and water and street

1 lights and so on.

2 The last issue that was sold was
3 sold at three thousand. Now the three thousand dollars per
4 lot, taxpayers, we hope, are not going to be affected by
5 the influx of the five thousand dollar ones. There will
6 probably be some effect, I know, but we're, I'd say,
7 particularly interested in the school situation and the
8 extra added revenue.

9 Like I say, you can't justify
10 spending a lot of money to providing a service when you've
11 only got two or three years to provide it and when you've got
12 to borrow money over twelve, or ten, or whatever, fifteen.
13 That's my answer.

14 MR. CHAIRMAN: Do any of the
15 panel have questions? Mr. LaCate, Dr. LaCate?

16 DR. LACATE: Actually I would
17 direct this toward Leo Bouckhout if I could? Will the
18 concern for safety play a role in the pipeline three miles
19 from Haines Junction, or were there other criteria, and what
20 were they?

21 MR. BOUCKHOUT: Well with respect
22 to the location in the Haines Junction area, the route was
23 defined essentially as short a distance as possible past
24 that particular area. We do consider the location of the
25 route and of compressor stations and so on relative to
26 communities in terms of attempting to keep the compressor

1 stations some distance from communities and the route as well,
2 where there is that possibility. Where you are not confined
3 by other constraints.

4 Certainly public safety is a
5 concern relative to pipeline systems. The inference was
6 made this morning that public safety is not considered. It
7 certain is. It's a very important element in selection of
8 final alignment for the pipeline system.

9 MR. CHAIRMAN: Would you like
10 to respond to the brief, Mr. Bouckhout?

11 MR. BOUCKHOUT: No, not really,
12 I don't think we have any comments to make at this time.

13 MR. CHAIRMAN: Questions or
14 comments from the floor?

15 Would you like to say anything
16 to sum up on this particular brief? You have another brief
17 there that you would like to read as I understand, is that
18 correct?

19 MR. OLSEN: Yeah, well in summary
20 I would just like to say that on behalf of the Businessmen's
21 Association, our main interest in supporting this proposal
22 of Foothills', is to create a permanent economic base and not
23 the two or three year thing. We feel that whatever environ-
24 mental damage may have been done, has already been done by
25 the construction of the Alaska Highway corridor in 1945 and
26 that these things cannot be reversed and there is also a

1 pipeline going down the road and we have lived with it for
2 some time. Really when you weigh the pros and cons, we can't
3 really honestly don't feel that it's been a bad thing.

4 So, on behalf of the Businessmen's
5 Association, we support the pipeline.

6 MR. CHAIRMAN: Okay, would you
7 like to continue with your next brief.

8 MR. OLSEN: To reiterate a bit,
9 this brief was originally presented to the Lysyk Inquiry and
10 at that Inquiry, once again, I presented it and I was cross-
11 examined by the Lysyk Inquiry and got criticism and so on
12 from the floor, and the criticism came from two major areas.
13 One was the native land claim situation, and the other one
14 was from a particular group of people who felt that, although
15 they weren't natives, they felt that the building of the
16 pipeline was part of the syndrome that would further destroy
17 an aesthetically appealing way of life that is available in
18 the Yukon.

19 So, in response to that, I once
20 again got up in front of the microphone and hummed and hawed
21 anyway, so this is the basis of my secondary report here. It's
22 very short and won't take long. So, I'll go ahead with it.
23 I apologize for not having it typed, but if it's erratic, I
24 will have to repeat myself, because I can't read my own
25 writing. So, I'll begin.

26 Mr. Chairman and Members of the

1 panel, ladies and gentlemen, I speak this time as an
2 individual who has lived in the Yukon for the past fourteen
3 years, and who has spent a great deal of that time training
4 as a biologist, and eventually I became one.

5 I left the profession five years
6 ago because I cared a little for the political side of
7 wildlife management and I found that nine tenths of wildlife
8 management is people management. I graduated in 1968 from
9 U.B.C. at a time when the ecology movement and the student
10 campus unrest was at it's peak. The political climate of
11 the day was to call down any establishment and call for more
12 research in to ecology and then come up with the predetermined
13 conclusion that the world was at an end, but there was a
14 slim chance that if everything ground to a halt and more
15 ecology researchers were hired, the world might persevere.
16 I graduated at a time when two hundred or so students obtained
17 degrees at U.B.C. and related to biological studies. But only
18 two jobs were open in B.C. for this graduating class and none
19 were in the Yukon.

20 To a large degree this philosophy
21 of any environmental change is necessarily bad is still
22 believed by the vast majority of the citizenry, particularly
23 because it was, and to some degree, still is, a favourite
24 topic for the press.

25 The flower children philosophy
26 and the ecology movement were backed by the press and formed

1 part of a popular political movement. As time goes on,
2 however, tests of the validity of this type of philosophy
3 have pointed out a few myths. I wish to point out just one
4 or two here today as pertains to this case, not to all things,
5 but to this particular case.

6 The main thing I wish to stress
7 is that the main myth is that environmental change means
8 environmental damage. A pipeline right-of-way is equated to
9 damage to wildlife, that is construction of any kind by the
10 way, the highway, electrical transmission lines, or pipeline,
11 necessarily means that a great deal of wildlife will be
12 killed off. In fact, the boreal climatic climax type of
13 environment where most of the pipeline would be going
14 through is a poor place for wildlife because the dark forest
15 with moss covered floor provides little forage.

16 Change of the boreal forest by
17 fire or man's construction of right-of-ways reverts the
18 dark forest to grasslands and shrubs, which in turn provides
19 food for chipmunks, squirrels and moose, which in turn means
20 more foxes and coyotes. There are many examples of this
21 found in the Yukon. Deer have increased due to the large
22 forest fire of 1958 which scorched hundreds of square miles
23 of boreal forest, reverting it to grasses, poplar, and willow.
24 Horses are a nuisance and a traffic hazard along road
25 allowances, because they are after the grass that grows there.
26 Moose have made a rather spectacular migration south, since

1 the turn of the century, due to the cutting of the forest
2 for either logging or agricultural purposes in central
3 British Columbia. They never used to have that sort of
4 range.

5 The range of predatory birds
6 and scavenger birds have increased in many parts of Canada
7 had and the peculiar change which follows road construction of
8 the northern areas, because road allowances provide food
9 for the gophers, which get drove over and become a food
10 source for the scavenger, as well as the predator. I say,
11 therefore, that construction of a pipeline right-of-way will
12 not decrease wildlife populations. They certainly will
13 change wildlife populations, but mostly for the better.

14 As for damage to the environment
15 where the gas leak occurs, I can see little, especially when
16 compared to what would happen if you have an oil leak. I
17 would also like to point out that used to be, and still is
18 a popular belief, that forest fires were unnatural, and
19 every expense is made to stop them. They certainly leave an
20 ugly scar on the landscape, but actually they revert the
21 climatic dark forest to primary successive species which
22 starts the cycle again. In this area, the cyle is about
23 one hundred to one hundred and twenty years. Forest fires
24 have been here long before man. They were set by lightning
25 or volcanoes, and are part of the natural constant change of
26 the environment.

1 I would also like to point out
2 that animals have been going extinct long before man arrived.
3 Man, in his ignorance, has speeded up and in many cases
4 annihilated some species for food, for decoration, or simply
5 didn't like the critter. But I would also like to point
6 out that there is going to be species eliminated as the
7 natural forces of evolution whether man likes it or not.

8 I believe that there has been
9 real wildlife damage, damage as it were in areas of
10 the Yukon, from the construction of the Alaska Highway. The
11 caribou used to cross over what is now known as Carcross, or
12 Caribou Crossing, and at least two points on the north
13 Alaska Highway, that I know of, near Burwash and Sheep
14 Mountain. I would be hard to evaluate what damage in terms
15 of population losses occurred, since it happened so long ago,
16 and there being no studies at that time. Perhaps the losses
17 were high, or perhaps they were low, insofar as the change in
18 migration patterns occurred in order to avoid the highway.

19 In any event, whatever damage
20 that could be blamed on the highway construction regarding
21 migration routes of caribou, or any other species, has already
22 occurred, and I don't believe a buried pipeline right-of-way
23 in the same corridor would add any further damage of any
24 consequence.

25 The Sheep Mountain area at 1064
26 bears special consideration. I guess we'll go over this one

1 again. In the event of pipeline construction, the area
2 around the Lake would need blasting in order to bury the
3 pipe. This area, however, is the winter grazing grounds of
4 the somewhat famous Dall sheep population. Since they only
5 winter in the blasting areas, I would recommend that blasting
6 be done in the mid-summer months. It's a bit of an enigma
7 that Sheep Mountain is famous for it's Dall sheep population,
8 but the tourists never get to see them because tourists come
9 up in the summertime but the sheep are gone and they spend
10 a great deal of time blasting the mountain to no avail.
11 Anyway, that's the nature of that one.

12 Insofar as large ungulate
13 wildlife losses occur due to access corridors in Yukon, I
14 would comment that the main reason losses occur is due to
15 poaching and other violations of the game laws. The policing
16 costs put a drain on the public purse. However, once again
17 in this case, this type of problem has already occurred, since
18 the corridor was established thirty years ago.

19 In conclusion, I would like to
20 summarize by stating that the popular belief that environmental
21 change means environmental damage, is a misconception perpetrated
22 by, not by evidence, in this case, but by other political
23 considerations.

24 MR. CHAIRMAN: Fine. Does the
25 panel have questions or comments?

26 Mr. Trevor?

1 MR. TREVOR: Mr. Olsen, do you
2 have any estimation of the amount of poaching that's going on
3 in the Haines Junction, the north highway area?

4 MR. OLSEN: No, I only have a
5 personal feeling. One of my jobs at Sheep Mountain was the
6 Game Warden, and as I was studying the sheep, I was doing
7 population counts and I found that there was quite an
8 absence of large male rams. There was myself and another
9 biologist there at the time, and as we did our studies, we
10 found that since there were resident Game Warden's on the
11 mountain, that over the course of two years anyway, that
12 there was about a, I would have to go back to my books, but
13 I would say about a ten to fifteen per cent change in large
14 ram ratio there was to ewes, dominant ram ratios to ewes.
15 We attributed it to the fact that there was Game Warden's
16 there.

17 Now with Parks Canada on the
18 job, the same sort of effect is certainly noticeable. It
19 makes a difference, a big difference, the big bane of the
20 tourists is when they come up the highway is that they don't
21 see any wildlife that they expect to see. They have to go
22 miles off the road in most cases. Not for foxes, coyotes,
23 or even moose so much, but they certainly do for bear and
24 wolves and those things that just don't get along with man.

25 MR. TREVOR: In specific
26 reference to Sheep Mountain, you're advocating if that route

1 is followed, the blasting for any trench be done during the
2 summertime. Is this correct?

3 MR. OLSEN: Yes.

4 MR. TREVOR: Do you have any
5 ideas about at what level on the shoulder of the mountain
6 would be the best location for the pipe if that was the
7 only place it could go?

8 MR. OLSEN: Well, I don't think
9 it makes much difference where they put it on the mountain,
10 if it's buried. So long as it's done in the summertime.
11 There is an existing pipeline, plus a telecommunications
12 corridor over the edge of the mountain. What is the
13 situation there, is there is a very steep mountain edge and
14 the road is narrowly pinched between the mountain and the
15 lake and they had to blast away a good deal of the mountain
16 at one point to build the road, and they built the pipeline
17 close by it.

18 The only damage to the sheep
19 of course, would be if they caught some flying rocks. They
20 are not afraid of traffic. They stand right on the road
21 many times I've seen it, when cars drive by. They're not
22 afraid of noises. They are afraid of helicopters. The
23 sheep have an inborn fear of avian predators, and that bothers
24 them. Definitely. I would say that with all my experience
25 about disturbing the ecology, that the three year study that
26 we had to do on the grizzly bears and the two year study I

1 did on the Dall sheep, by far the most disturbing ecology in
2 that park was us guys catching them and putting them in
3 traps and damming and so on. That really disturbed them
4 all right. The helicopters are a major factor.

5 MR. TREVOR: Particularly on
6 that shoulder of Sheep Mountain, it would appear that you
7 could really say that those sheep were over grazing. In
8 your opinion, what would be the effects of the pipeline
9 right-of-way going through which was then seeded with
10 possibly foreign species of grass until the natural growth
11 came back in. Would this tend to attract the sheep, do you
12 think, or the opposite?

13 MR. OLSEN: Well, we can take the
14 old pipeline as an example. Nothing came any different than
15 was there already. It is so heavily overgrazed, and going
16 back to my opening statements, and I left biology for
17 political reasons, and my finishing one that, well anyway, I
18 want to say that the problem, the overgrazing problem of
19 Sheep Mountain has been known for a long time. So, it's a
20 park. Now, what do you do? You should go in and eliminate
21 some of the older animals that are going to die anyway. But
22 who do you give that to? Do you allow Game Wardens only to
23 do it? Then you've got everybody disclaiming the government.
24 If you -- do you give it to the natives? Then you've got
25 another hassle. If you give it to the outfitters who want
26 it too, they figure we have a right to go in there, then the

1 local residents say that foreign hunters should come last, we
2 should come first. You draw lots. So what usually happens
3 in situations like this, is that nothing is done, or ever
4 will be done, because of the political considerations and
5 nobody wants to disturb the waters. In fact, they are over-
6 grazing the land and by quite a bit. Who do you give the
7 hunting privilege to?

8 MR. TREVOR: The point I was
9 really trying to get was whether in your opinion the seeding
10 of the right-of-way might not improve the situation in terms
11 of the overgrazing, rather than the opposite.

12 MR. OLSEN: I don't think so,
13 because Sheep Mountain is such a bare desolate hill that, --
14 you see, the thing that Sheep Mountain as is all major
15 wintering areas for sheep, is that they are short legged
16 animals and they have to have low snow conditions so all
17 their winter grazing areas are where there are low snow levels.
18 Their short legs makes them fast climbers to get away from
19 predators, but on the other hand, they get trapped in the
20 deep snow, they're finished, and they only have a limited
21 ability to dig snow craters. So, their major problem is
22 they have to live on windswept slopes. Sheep Mountain is one
23 of them. There are many, but that's one of them. It being so
24 windswept and nothing gets to grow there very much anyway
25 except a very low stubble, and the drifting silt-sand effect
26 mows the grass off quite regularly, and so they are always

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1 the limiting factor there will always be food, and not
2 predators or poaching, although it certainly makes a
3 difference, but food is certainly the main factor there.

4 The only reason they are there
5 is because of food, because the food is available, but it
6 also limits them in total numbers, because there is just not
7 enough food for all of them to perpetrate forever.

8 They are losing about ten per
9 cent per year to predators.

10 MR. TREVOR: Thank you.

11 MR. CHAIRMAN: Mr. Chambers?

12 MR. CHAMBERS: Mr. Olsen, I
13 was wondering in your experience what the sheep on the Sheep
14 Mountain will you suggest when summer construction, if
15 construction goes by there, could you be more specific in
16 your suggestion of the time frame in the summertime?

17 MR. OLSEN: They leave about
18 the 24th of May. That is when most of them are gone, and
19 they come back about the first week in September. So I
20 would recommend say July or August, sort of thing. July
21 particularly, July. That would be the time.

22 MR. CHAIRMAN: Mr. Wykes?

23 MR. WYKES: Mr. Olsen, in your
24 second brief you mention that major construction projects
25 do not necessarily cause detrimental effects to wildlife.
26 Can you think from your knowledge the wildlife in the Haines

1 Junction area of any benefits to the wildlife populations
2 that could be derived from the Foothills building the pipe-
3 line in that area?

4 MR. OLSEN: Well, it would take
5 about five or six years after the right-of-way has been
6 cleared for the grass to come back, and probably another three
7 or four, five after that, for the shrubs to come back.

8 This certainly will mean more of
9 the foraging species, which in turn means more predators. One
10 common example is bear. Bear in the Yukon are primarily
11 vegetarians, and their main food source, at least in the
12 Haines Junction area, was a bush called Shepherdia Canadensis,
13 and it's called Soap Berry, it's related to the Buffalo Berry
14 of the prairies. It's a small shrub about three feet high,
15 and has a lot of red berries. It's very bitter, but the
16 bears eat them and love them, and this is one of the things
17 that would come in after examination of the forest. It
18 certainly does in that area. The Alsek Valley, immediately
19 adjacent to Haines Junction has a very large bear population
20 of both black and grizzly, and the only reason that they
21 are there is because the Lowell Glacier, about a hundred
22 years ago, dammed the lake off -- or dammed the river off,
23 dammed the Alsek Basin off, and what happened was, it made a
24 lake, and I think at it's highest point, I believe, it was
25 a hundred and twenty-six feet high and it stayed that way
26 I don't know how long, but at least for several years, enough

1 that it killed all the trees that it drowned, and when the
2 ice or the water line got high enough, they went over top of
3 the ice and cut a hole through the ice and drained the whole
4 thing, and you've got a bare lake bottom. Well sixty years
5 later, or eighty years later, it is one of the main species
6 there is Willow, and Shepherdia Canadensis, and therefore is
7 the reason for the high bear population there.

8 So, all I am saying is there is
9 an example of natural forest succession where the climatic
10 climax was reverted to the successive species and has benefitted
11 the wildlife population. That is a known one. That has been
12 well studied.

13 MR. WYKES: Are there any other
14 species of animals you could think that might benefit, or
15 might grow in population size?

16 MR OLSEN: Well, like I said,
17 in the park area, certainly the chipmunks and the ground
18 squirrels feed off those berries. Mice feed off the grass.
19 Horses feed off the grass. Moose feed off the willows. The
20 favourite hunting spot, for two reasons, out our way is the
21 pipeline, the old pipeline route, because one, they are
22 visible for long distances, and secondly, they are a
23 favorite grazing spot because of the willow. I might add
24 that the, like I said before, the U.S. Army used to fly
25 the pipeline every two years -- or every two -- twice a week
26 and herbicide every four years in order to kill the willow and

1 kill the grasses so they could see the pipe. So what I'm
2 saying is that plants do grow after you bury a pipe, and
3 the Haines-Fairbanks pipeline, about half of that was buried
4 and about half of it wasn't.

5 Does that answer your question?

6 MR. CHAIRMAN: When we travelled
7 down the pipeline. We stopped at the communities. One of
8 the contentions was that the largest environmental effect on
9 Sheep Mountain, besides the sheep, which was pretty well
10 understood, was the aesthetic, architectural effect of having
11 a scar high up on Sheep Mountain. That this was purported
12 to be an undesirable thing to have on Sheep Mountain, but
13 especially on Sheep Mountain in a national park. Did you
14 consider this aspect when you were preparing your statement?

15 MR. OLSEN: Well, the scar?
16 Yes, it will be there. Their prospects go below the road on
17 the right hand side, outside of the park. There are two scars
18 there already, plus a very unsightly gravel pit. They are
19 visible. They should be fixed, I believe, from an aesthetic
20 point of view. So, if I was the fellow in charge of the
21 pipeline conditions, I would say, yes, that quarter or half
22 mile section there, I would spend a lot of time on it and keep
23 the scars to a minimum, absolutely.

24 I think it's also important that
25 somebody should place a sign up there explaining the thing
26 to the tourists, because they, in my experience, they waste

1 an awful lot of time blasting that mountain when there's
2 nothing there. There's no way they can make the sheep come
3 back to Sheep Mountain in the summertime and never will.

4 That's just one of the things,
5 but they'll know. When a tourist driving he sees these signs
6 that says "Home of Dall Sheep" and going into the game
7 sanctuary "Kluane National Park - No Hunting" and all this
8 sort of thing, but nobody explains why they don't see anything
9 and the tourist after he has a boo at that, he comes back
10 very discouraged, because he's been ripped off and misled.
11 In fact, he just wasn't informed.

12 MR. CHAIRMAN: I'll get to you
13 in a minute, okay? I want to read your statements here.
14 Any more panel comments or questions? Staff?

15 MR. SCHILDER: I have one
16 question for Mr. Olsen.

17 Mr. Olsen, you have demonstrated
18 a great capability to observe a number of phenomena in nature
19 in a place where you have been living. I wonder whether you
20 might be able to indicate or provide me of an opinion of
21 what may be expected, a probable impact of the pipeline on
22 the rivers, or lakes, or water bodies, especially perhaps
23 fishing, or aquatic life in your area?

24 MR. OLSEN: Well I suppose if
25 you get a break in the line under the water in the wintertime,
26 gas cannot escape for at least -- it has to escape down river

1 a long ways. It might kill some fish. Probably would. I
2 don't know, I'm not an expert on fish, but I can see that
3 being the biggest problem insofar as any wildlife is
4 concerned. There's no bringing the caribou back so that they
5 will cross the highway again. They have left forever.

6 Fish, in the case of a break --
7 under the construction period I don't think it's going to
8 bother the fish much. We have a good example out our way
9 with the Aishihik Power project. I believe the damming off
10 of the Otter Falls at Mile 27, they spent a million dollars
11 putting in a fish ladder, and everytime I've been out there,
12 I've noticed the fish don't use it. They swim in the large
13 pool behind the dam. It definitely has an effect, but the
14 line is buried, or at least deep in the river, I can't see that
15 happening.

16 MR. CHAIRMAN: Mr. Low?

17 MR. LOW: Mr. Olsen, do you
18 think the wildlife studies conducted by Foothills adequately
19 assessed the wildlife concerns in the area you are familiar
20 with? Based on your biological background and familiarity
21 with the area.

22 MR. OLSEN: Well, no. But I
23 don't blame it on them. So far as I know, there has only
24 been two documented studies on the north Alaska Highway
25 regarding fishing and the large game populations. The one
26 was done by the Canadian Wildlife Service that I worked on,

1 and that was just published recently, and the other one was
2 done by myself, which has never been published. So, it's
3 pretty hard for them to go ahead and spend the millions of
4 dollars that we spent in such a short period of time to come
5 up with an adequate evaluation. I am here because I want
6 to add some information. But I don't think it's possible
7 in that short period of time like this for anyone to do the
8 sort of things that would be necessary. You could research
9 forever.

10 MR. LOW: Yes, but did you feel
11 it expressed your opinions on what a pipeline may have --

12 MR. OLSEN: To a large degree,
13 yes.

14 MR. LOW: Thank you.

15 MR. CHAIRMAN: Foothills, would
16 you like to comment on that?

17 MR. BOUCKHOUT: Just a couple of
18 very brief comments, Dr. Hill, with regard to Mr. Olsen's
19 concerns relative to Sheep Mountain. We concur with that
20 concern. In fact we have stated that the construction of
21 the pipeline system in the Sheep Mountain area would in fact
22 be done in the summer for the very reasons he has already
23 mentioned.

24 With respect to a comment on
25 gas pipeline breaks in the river, I wish to just make one
26 brief comment; that in Alberta Gas TrunkLine's experience,

1 with the myriad of river crossings they have in Alberta, there
2 has never been a pipeline break within an actual river,
3 within the water. Of course in construction of river crossings
4 you do use heavy walled pipe and so on, so it's just a note
5 relative to experience that there never has in fact been
6 a gas pipeline break to my knowledge in the actual water body
7 itself.

8 With respect to aesthetics,
9 relative to Sheep Mountain. We are carrying out, and have done
10 so since this project was conceived, as I mentioned in
11 earlier discussions with Parks Canada officials, aesthetics
12 is one of the considerations which is being discussed. We
13 are looking at options for the Sheep Mountain routing, the
14 existing Haines-Fairbanks products line right-of-way is an
15 obvious option.

16 With respect to seeding of the
17 line. In this particular area and in all areas, revegetation
18 efforts are primarily directed towards stabilization
19 initially. That is terrain stabilization or slope stability,
20 erosion, in particular, over the long term in an area such as
21 Sheep Mountain, it is possible that revegetation would not
22 necessarily be undertaken. If you discuss this in the
23 context of aesthetics, revegetation on a linear feature such
24 as a pipeline right-of-way may in fact cause more detracting
25 from aesthetics than add to aesthetics, which you may end
26 up with is a band of green and otherwise unvegetated surface.

1 Those are all the comments
2 that I would like to make at this time.

3 MR. CHAIRMAN: Could I follow up
4 on this alternatives for Sheep Mountain? Could you describe
5 the alternatives being considered? Is one of them a lake
6 crossing?

7 MR. BOUCKHOUT: In fact, Dr.
8 Hill, we have looked at a lake crossing as an alternative.
9 We sounded the depth of Kluane Lake toward the southern
10 end. In view of trying to come to grips with whether that
11 would be a sound alternate or not. The results of the depth
12 sounding of Kluane, indicate that due to the fairly
13 precipitous drop off in the lake, close to Sheep Mountain,
14 very close to the existing highway, that it's in our
15 current estimation it's probably not a good alternate. I
16 don't know the actual depth of the lake, but the depth is
17 represented in the soundings and it is, as I recall, in the
18 order of one hundred and eighty to two hundred feet and is
19 very precipitous. In other words it reaches that depth
20 very near shore.

21 With respect to routing on the
22 opposite side of Kluane Lake, we have also investigated
23 that. There are significant implications in terms of valleys,
24 in terms of active bans , in terms of particularly
25 geotechnically related implications which would indicate
26 that, and additionally there would be involved in such a

1 routing the crossing of the arms of Kluane in the northeast
2 portion of the lake. All of these factors taken into account,
3 would indicate that that as an option is not a particularly
4 good one.

5 Now, with respect to the shoulder
6 of Sheep Mountain itself. As I say, the three basic options
7 which again would take into consideration the kinds of things
8 that Mr.Olsen has mentioned, would be utilization of the
9 existing Haines-Fairbanks products line right-of-way;
10 utilization of the pole line right-of-way, which is farther
11 up, and the additional possibility would be to utilize the
12 edge of the right-of-way of the existing highway.

13 This obviously has significant
14 implications in terms of designed parameters or installing
15 a high pressure gas pipeline at the edge of the highway, but
16 this is a possibility that is being looked at.

17 MR. CHAIRMAN: What consideration
18 rendered the existing pipeline right-of-way unacceptable when
19 you chose the existing route?

20 MR. BOUCKHOUT: We had looked
21 at the -- very briefly, at the existing pipeline right-of-way.
22 There are failures on the existing pipeline right-of-way in
23 terms of small scale slope failures.

24 In terms of the route, it was
25 decided that it was an area where all options would have to
26 be explored because of the sensitivity of the area and there-

1 fore we adopted as an original line on the map to simply call
2 the existing coal line right-of-way, which is, I believe,
3 where the line is shown now. Fully realizing that we would
4 have to explore all other options in this particular area.

5 MR. CHAIRMAN: Could you tell me
6 how that's coming along, and how many alternatives it involves,
7 for instance, does it involve a Kluane Lake crossing farther
8 away from the delta to get away from this precipitous drop?
9 What are the alternatives being considered, and when will
10 your study reach fruition?

11 MR. BOUCKHOUT: The basic
12 alternatives we are considering right now are concentrating
13 on the crossing of Sheep Mountain itself. We're not
14 concentrating on alternatives which would avoid a crossing
15 of Sheep Mountain for the reasons I have already mentioned,
16 given our initial look at the lake crossing, as well as a
17 routing on the opposite side of the lake.

18 MR. CHAIRMAN: So the three
19 alternatives we're considering is -- are along the highway
20 itself, plus the original products line right-of-way, plus
21 the right-of-way as proposed by --

22 MR. BOUCKHOUT: That's right,
23 that's right. These are being considered primarily in the
24 house now as a discussion between the engineering group
25 of geotechnical people and ourselves. We have scheduled in
26 fact, joint meetings between ourselves, national parks, and

1 Department of Public Works officials to discuss the overall
2 implications of this particular routing since, obviously, the
3 highway in the area is also implicated in the Shatrack
4 project, and therefore there are many implications in terms
5 of highway routings and in terms of pipeline routings and
6 national park concerns, strict biological concerns and so
7 on. It's quite a complex situation, which I'm sure you
8 appreciate.

9 MR. CHAIRMAN: So, when would
10 you expect these -- your considerations to result in a
11 report, or a determination?

12 MR. BOUCKHOUT: I would like to
13 take that under advisement and try and provide an answer
14 to you on that particular topic at the end of this week or
15 some time next week if I could. Subsequently, particularly,
16 to the upcoming meeting we have as well.

17 MR. OLSEN: You may not be
18 aware of it, I believe the Alaska Highway right-of-way was
19 three hundred feet wide, and yet the Kluane Game Sanctuary
20 defined about 1948 or so, '44 anyway, was described as being
21 a thousand feet back from the centre of the highway. Okay,
22 so we already have two different sets of guidelines. The
23 third guideline was in Kluane National Park, when they
24 determined the boundaries, one of the errors where they wanted
25 it right down to the very edge of the road was Sheep Mountain
26 in order to protect that sheep population. So going back to

1 my original thing that I was recommending, if I may, you've
2 got three different sets of rules already plus a fourth
3 of the pipeline one. These people just have to get together,
4 because there's lots of different rules laid down by
5 different government organizations, and unless it is
6 co-ordinated as such as he suggests, it's going to be tough.
7 It's hard on the people who are working on it. It certainly
8 is hard on the people who try to describe the boundaries of
9 Kluane National Park for the same set of reasons.

10 MR. CHAIRMAN: Yes, sir?

11 MR. THEBERGE: My name is
12 John Theberge. On the subject of the scar on Sheep
13 Mountain, could I ask for a point of clarification from
14 Mr. Bouckhout. I understand that we're talking of a right-of-
15 way of one hundred and twenty feet. Can you lay pipe from
16 a flat surface, your alignment possibility on Sheep Mountain
17 is on about a forty per cent slope. Does that mean you have
18 to create a horizontal bed to lay it from, , and then grade
19 so you don't have a vertical slope on one side?

20 MR. BOUCKHOUT: Yes, Mr. Theberge,
21 you do have to have a horizontal, or near horizontal surface
22 from which to lay pipe. You do not, however, particularly
23 in short distances like this, necessarily need a hundred and
24 twenty feet. In fact, the bulk of our right-of-way throughout
25 the Yukon will not be a hundred and twenty feet. This will
26 more likely be closer to ninety feet. We are requesting a

1 hundred and twenty feet. This is permanent right-of-way
2 of sixty feet, plus sixty feet of working space, which would
3 be discharged when the construction is completed. The
4 request for that width is to accommodate those circumstances
5 where you require such a width in order in particular
6 eventualities where you require that much width in order to
7 efficiently carry out pipeline construction.

8 We will not be clearing as a
9 general rule a hundred and twenty feet throughout the entire
10 length of the pipeline route in Yukon. We'll clear what
11 we feel is necessary to adequately carry out efficient pipeline
12 construction. But as I say, in most cases, that will
13 probably be in the order of ninety feet.

14 MR. THEBERGE: Then besides the
15 ninety feet, ultimately is there going to be a vertical cliff
16 on one side, or in addition then are you going to grade that
17 down? I'm trying to think of what the scar is going to look
18 like?

19 MR. BOUCKHOUT: Well, after
20 the ninety feet in an area such as Sheep Mountain, we would
21 not require ninety feet. The construction in an area such as
22 this could be planned such that it could be done in a much
23 narrower right-of-way. Now in terms of minimal width
24 construction space that we would require, I would suspect
25 and I stand to be corrected on this, would be something
26 probably in the order of fifty to sixty feet in that general

1 order. In other words, what we would do is minimize the
2 width or flat surface required to actually trench the line
3 and lay the pipe. I think it would be in the order of fifty
4 to sixty feet, but it may be a bit narrower than that. That's
5 a fairly reasonable ball park, I think, to discuss now. Now
6 in effect what you would have to do if we were to construct
7 the pipe on the slope would be to prepare a relatively flat
8 bed from which to work and in so doing, then you would
9 additionally have to have a relatively stable back slope.
10 Now that doesn't mean that you cut directly in to the
11 slope from the existing slope in fifty feet and then up. It
12 can be to a degree a cut-in-hill kind of operation with the
13 material you take from the top, you push to the bottom and
14 you balance the two out. But there definitely would be a
15 scar under the circumstances whereby you clear that level
16 surface in order to install the pipe.

17 The magnitude of the scar in
18 my estimation it wouldn't be a great deal different than the
19 existing scar you see now from the Haines-Fairbanks line.
20 It would be somewhat larger I expect where we're dealing of
21 course with much larger pipe. But, it wouldn't be several
22 yards magnitude, by any means, larger. It would be -- I
23 wouldn't even want to give you a precise number or anything
24 because I simply can't at this time.

25 MR. THEBERGE: No, but roughly
26 then, if my geometry would be correct, if we're approaching

1 a forty-five per cent slope, with sixty foot vertical on
2 one side, we have a sixty foot, fifty or sixty foot, I mean
3 horizontally you can't -- fifty or sixty vertical on the
4 other side of it, of the triangle.

5 MR. BOUCKHOUT: Could you go
6 over that again. We've got fifty feet on this leg.

7 MR. THEBERGE: Is there chalk
8 on that blackboard by any chance? If we're on roughly a
9 forty-five degree angle, cutting a horizontal bed, sixty
10 feet to work from to lay your pipe from, it would be roughly
11 a fifty foot vertical side.

12 MR. BOUCKHOUT: Okay, now if
13 you would consider the scenario I mentioned to you a bit
14 earlier, the cut and fill scenario, you wouldn't be coming
15 in in fact, sixty feet, you'd be coming in thirty feet.

16 MR. THEBERGE: Sloping something
17 like that?

18 MR. BOUCKHOUT: Correct.

19 MR. CHAIRMAN: Thank you.

20 MR. OLSEN: If you go along
21 the existing Haines-Fairbanks right-of-way thing, the actual
22 I think the distance now is about fifteen feet. I know you
23 can just barely drive a pick-up over it, because I used to
24 drive it all the time. But you go steeper down to the edge
25 of the rock bluff certainly you're going to get in to a
26 hundred feet wide in order to do the same job. I'm no
engineer, but I don't know whether you can build a pipeline

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1 under a road or on the right hand side of the road or not.
2 I don't know. You want to minimize environmental damage then
3 that's the place to go, but if you're going to go on the
4 mountain, better to go higher than you are lower in order to
5 cut any scars down. The higher up you go, the less the
6 slope is, over that particular bad spot that you are referring
7 to.

8 MR. CHAIRMAN: Mr. Wykes?

9 MR. WYKES: Mr. Bouckhout
10 following along that same scenario, is there any need to keep
11 the surface in a horizontal position there after the pipe is
12 installed, or would there be any way of filling back the
13 slope to the original alignment?

14 MR. BOUCKHOUT: Yes, it could
15 be built back to somewhat the original contours. It's not
16 absolutely essential to maintain the completely flat right-of-
17 way once construction is completed.

18 MR. CHAIRMAN: Any other comments
19 or questions from the floor?

20 Yes, sir?

21 MR. MORLAND: My name is Richard
22 Morland from the National Museum of Man. I choose to comment
23 at this time, even though I'm next to speak with a brief,
24 because I would like to amplify one thing that I'll just
25 touch on in my brief. You mentioned -- first of all I
26 appreciate many of the aspects of balance in your statement

1 concerning the impact of a project of this kind on wildlife
2 and the environment in general.

3 I'm happy to say I got out of
4 graduate school before the flower children philosophy
5 emerged, but I am concerned about one aspect of it. Especially
6 with regard to man's role in extinctions and especially
7 with regard to the history of extinctions in Alaska and the
8 Yukon. There was a very different environment here up until
9 about fourteen thousand years ago, and that very different
10 environment which I shouldn't try to elaborate on now,
11 supported dozens of large game animals, dozens of ungulates,
12 different species, and all of these animals were converting
13 the plants of the landscape in to a usable food for man.
14 Well, all but a few of them became extinct by about ten
15 thousand years ago, or just a little bit later. One of the
16 things I'm studying in this area is man's role in that
17 extinction process. We don't know what that role is yet.
18 He's thought to have played some role. Certainly he was
19 around by then. He was around by at least thirty thousand
20 years ago.

21 Some people, such as Dr. Paul
22 Martin at the University of Arizona thinks that man was just
23 plain responsible for killing off all those animals.

24 Well, what we're left with today
25 is an environment in which there are really only three
26 significant ungulate species converting the lichens and mosses

1 and willows of this landscape in to useable food for us and
2 other carnivors. Since we don't usually eat lichens and
3 mosses and willows without that transformation through the
4 digestive systems of these animals, I think those three
5 species have to be handled with more than usual care. All
6 three of them do different things than one another. Each
7 is unique in his role, and if we lose any one of them, we
8 will lose thousands of square miles of Alaska and the Yukon
9 as sources of usable food for man.

10 This is not to say we can't
11 build a pipeline because these animals are here and they
12 are the only ones left, but I did want to put in a cautionary
13 note about the significance of these animals when seen in
14 this kind of historical perspective.

15 MR. CHAIRMAN: Thank you.

16 Yes?

17 MR. THEBERGE: I would like to
18 follow on Mr. Morland's comments by pointing out that one of
19 those three species is primarily a climax species, and that's
20 caribou. And in Mr. Olsen's discussion about the benefit to
21 wildlife, the very successional species which in general are
22 true, in a specific case, and one that will be discussed more
23 probably later in the hearings related to caribou. Man's
24 impact is often negative when he turns forest back to earlier
25 stages of succession.

26 MR. OLSEN: I agree with that

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1 caribou has been a loss, but my presentation has simply
2 pointed out that the corridor did that loss thirty years
3 ago. We can't bring them back, at least I don't know how.
4 I admit the loss as much as anyone does.

5 Another one that can't live
6 very well with man is moose, bear. But that is once again gets
7 more in the political realm than it does in the biological
8 one.

9 MR. CHAIRMAN: Any other
10 comments from the floor? We have one over here on the staff
11 table, but we'll take the floor first? Mr. Lister?

12 MR. LISTER: My name is Brent
13 Lister. I would like to ask a question of Mr. Bouckhout
14 before we get off the subject. It pertains to crossings of
15 Kluane Lake. I was wondering if Foothills have sounded the
16 lake several miles north of the mouth of Slims River and
17 had concluded essentially the same with respect to the
18 contours and the depth as they did in the area around Slims
19 River apparently?

20 MR. BOUCKHOUT: Not to my
21 knowledge.

22 MR. LISTER: I was just thinking
23 that there is -- it would seem that there is a possibility
24 of taking a reasonably short route across the lake several
25 miles up from the existing mouth of Slims River in your
26 existing alignment?

1 MR. BOUCKHOUT: That might be
2 a possibility, however, that would also implicate that we
3 would immediately be on the opposite shore of the lake and
4 have to contend with the kind of geotechnical problems I
5 indicated that appears to be relevant to that shore.

6 MR. LISTER: The realignment I
7 was considering would put the pipeline landing just north
8 of the mouth of Christmas Creek in that area. Is that an
9 area that's difficult from a geotechnical standpoint?

10 MR. BOUCKHOUT: I'm advised
11 by Mr. Claridge that that might be a possibility.

12 MR. LISTER: Do you mean that
13 that is possibly a viable alternative?

14 MR. BOUCKHOUT: It's strictly a
15 geotechnical point of view from his knowledge of the area,
16 that geotechnical problems are not as serious in that particular
17 area.

18 MR. LISTER: Thank you.

19 MR. OLSEN: I can add to that
20 on, at least in my opinion it would be at least a desirable
21 route, and the reason for that is that one you've got so
22 much more distance to go. The Kluane Lake on the north
23 shore has two arms, a little arm and a big arm, and I'm not
24 too sure how deep the little arm is, but I know that the big
25 arm is twenty miles deep. So you'd be running along the north
26 shore and you'd have to stop and say from the beginning of the

1 arm across there, going about half to three quarters of a
2 mile, because you've got to go twenty miles up and twenty
3 miles back in order to accommodate that thing, or you've
4 got to go way, way north, and once again you're going to be
5 creating another corridor. All the nasty effects of corridors
6 that are already being established, are going to just do
7 that again on the north shore of Kluane Lake. I know for
8 instance, that the outfitters are very upset about the
9 construction of a road on the north side of Kluane that goes
10 from Christmas Creek to what is known as the Blackstone
11 River and there's a mining or gold placer operation that's
12 been off and on since 1904 and the outfitters are very
13 upset about the mining roads and any sort of access in to
14 that area because that is one of the prime big game hunting
15 areas of the Yukon, and certainly one of the best.

16 If you've got a choice, even
17 with Sheep Mountain, I'd take the south side. I certainly
18 wouldn't go on the north side.

19 MR. CHAIRMAN: Any other comments
20 or questions anywhere? Did you find Christmas Creek on your
21 map? Yes, was that somebody who wishes to speak?

22 Would you like then to sum up
23 your brief?

24 MR. OLSEN: Very briefly, actually
25 it was about time that somebody, or I felt that the nature of
26 these hearings might be to the effect that some the overriding

1 opinion would be environmental damage meant environmental=
2 change meant environmental damage. I just wanted to correct
3 that thing, because I feel it's a misconception.

4 MR. CHAIRMAN: Thank you very
5 much.

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1 MR. CHAIRMAN: Mr. Morland, or Dr. Mor-
2 land, is it Dr. Morland.

3 MR. R.E. MORLAND: Well, I believe I
4 should say who is represented by this statement. I'm the
5 Yukon archeologist with the Archeological Survey of Canada,
6 National Museum of Man, which is one of the National Museums of
7 Canada and, therefore, I'm speaking to you as a federal public
8 servant charged with the responsibility for prehistoric archeo-
9 logy on federal crown land in the Yukon Territory.

10 "The Applicant has done a creditable job,
11 in my opinion, of archaeological assessment along the Alaska
12 Highway. The data, in the application reflecting known site
13 distributions appear to be complete, and most of the concerns
14 which arise from major construction projects have been present-
15 ed in a balanced manner with recommendations in keeping with
16 general archaeological expectations, as well as with previous
17 pipeline considerations. Most aspects of the archaeological
18 concerns would be adequately covered if the recommendations
19 respecting archaeology were made conditions of the permit.

20 But several thoughts appear to need more
21 explicit statements and that's why I'm here today. Known site
22 distributions may be quite misleading. Research on archaeology
23 in the southern Yukon to date has been conducted primarily along
24 the Alaska Highway, and very few surveys have been carried out
25 along waterways and along lake shores away from existing roads.
26 This is in marked contrast to the northern Yukon pattern where

1 the absence of roadways has caused archaeologists to organize
2 their surveys along streams and around lakeshores. Since pre-
3 historic transportation patterns more closely reflect the drain-
4 age ways of the natural landscape, the northern Yukon research
5 may have provided us with a better reflection of real site dis-
6 tribution there. In the south, on the other hand, the survey
7 work to date may not have sampled such distributions adequately.
8 Reconnaissance along waterways in the near future should reveal
9 the extent to which the logistic biases posed by the Alaska
10 Highway have given us a possibly erroneous view of prehistory
11 in the region. Certainly, we have a preliminary view in any
12 case.

13 Most known archaeological sites could
14 be salvaged quickly were they to be threatened by a development
15 project. Only a few are of monumental importance and warrant
16 indefinite preservation and perhaps even restoration for public
17 display purposes. The real impact of the pipeline project could
18 lie in the area of unknown sites - currently unknown sites -
19 which would be discovered during construction. This observa-
20 tion can be summarized by referring to the pipeline project as
21 a two-edged sword from the standpoint of archaeological re-
22 sources. Although some archaeological sites may be subject to
23 damage or destruction, other sites may be discovered which might
24 otherwise never come to the attention of archaeologists. We do
25 not yet have a basis for assessing the importance of this possi-
26 bility for site discovery in a pipeline project, but even the

1 recovery of a few very ancient wellpreserved sites could augment
2 our knowledge of Yukon prehistory quite considerably. The Ap-
3 plicant seems not to have devoted quite enough attention to
4 the conduct of investigations on such sites discovered, for
5 example, during the ditching phase of construction. What means
6 can be devised for marking such sites at the time of discovery
7 and preserving the markers for later investigation of site
8 contents?

9 For those few sites which may actually
10 warrant excavation following completion of the construction
11 phase, what limitations will be placed on access to the right-
12 of-way for such investigations?

13 Obviously, the area of the site within
14 the ditch and the backfilled area itself would be too badly
15 disturbed to warrant further examination. However, some such
16 sites would likely be of sufficient lateral extent to enable
17 archaeologists to recover useful information through excavations
18 conducted after the pipeline has become operational.

19
20 Keeping in mind the need for stable ero-
21 sion control measures and other such considerations, to what
22 extent will archaeologists have an opportunity to carry out
23 excavations in the vicinity of the pipeline?

24 The advantageous aspects of pipeline con-
25 struction with respect to site discovery would come to naught
26 if access to newly discovered sites were prohibited until de-

1 commission of the line. Even the act of discovery on sites
2 of this kind would likely set in motion various processes of
3 site degradation through the introduction of oxygen to the
4 site matrix and through changes in the moisture content of the
5 surrounding matrix. For these reasons, such site investiga-
6 tions following construction should be seen as an integral part
7 of the archaeological project. For those few sites which might
8 warrant such consideration, we would like some discussion of
9 the limitations which would be placed on these kinds of inves-
10 tigations.

11 The Applicant has done as thorough an
12 analysis of potential site distribution as could be expected
13 on the basis of our very limited sample of known sites and on
14 the basis of landform and drainage analysis. Such predictions
15 can be quite hazardous, however, since they must be based upon
16 present landforms, soil types, and vegetation patterns. Dis-
17 tributions of ancient sites could differ quite markedly from
18 more recent ones simply because of environmental changes
19 since the time of ancient occupations.

20 Areas now occupied by muskeg in which
21 the likelihood of site discovery is very low, could have been
22 characterized by much drier substrate with a deeper active lay-
23 er in the distant past. Deeply buried sites could appear unex-
24 pectedly in such areas. This means that no portion of the ditch
25 should be ignored as a possible source of archaeological mat-
26 erials. All ditch walls should be examined, and provisions for

1 adequate lighting and logistic support should be ensured for
2 this phase of archaeological work.

3 In view of the several other routes
4 now under consideration, we must ask whether the Applicant is
5 prepared to conduct a thorough evaluation of known sites and
6 site potential in the Dawson area, along the Dempster Highway,
7 along the Klondike Highway, and in the Tintina Trench. Will
8 assessments similar to that along the Alaska Highway be
9 undertaken in these areas if these routes are seriously consid-
10 ered?

11 Finally, I wish to note that these
12 archaeological concerns are not merely esoteric items of
13 strictly academic interest. The public is increasingly aware
14 of the educational importance of archaeological work. There
15 are lessons to be learned from the past. In general terms, we
16 should always remember that the earth's surface and its re-
17 sources can only be understood in the present through a study
18 of their past development and evolution.

19 For example, in the Yukon and Alaska,
20 we are studying the complex problem of late Pleistocene extinc-
21 tion of large game animals. Of the dozens of large animals -
22 mammals, which roamed this region until 10,000 years ago, only
23 a few species are left today. The others died out thousands
24 of years ago, and we still do not know man's role in the extinc-
25 tion process.

26 As we develop the mineral, petroleum,

R.E. Morlan
B. Trevor

1 and hydroelectric resources of this region, we must safeguard
2 these non-renewable historical resources enclosed in the upper
3 layers of the soil and sediment. Only from such resources
4 can we learn the lessons of the past and evaluate our role for
5 the future.

6 As Leo Tolstoy has noted, appreciation
7 consists of understanding combined with enjoyment. We can
8 enjoy the Yukon in many ways, but we cannot fully understand
9 and thereby appreciate the Yukon merely by looking at it
10 today.

11 MR. CHAIRMAN: Thank you very much.
12 Are there any questions from the panel?

13 MR. TREVOR: Dr. Morlan, I take it from
14 your recommendations within your brief here that you would
15 consider an archaeologist should be present while the ditching
16 is actually going on. Is this correct?

17 DR. MORLAN: Yes, and in fact, as I
18 didn't know how much I had to go into stipulations here, but
19 the observation in earlier hearings was that there should be
20 an archeological team present on each construction spread, as
21 construction proceeds, in order to literally examine the ditch
22 walls.

23 MR. TREVOR: Your terms and recommenda-
24 tions will of course be gone into in detail at a later stage,
25 if, indeed, this route is selected. I was asking that ques-
26 tion mainly so that we could query the Applicant when his turn

1 came around to find out what his opinion was.

2 MR. CHAIRMAN: Panel staff, do you
3 have questions?

4 Mr. Timmermans?

5 MR. TIMMERMANS: Well, it's really a
6 question for Mr. Bouckhout, I suppose. Assuming that Dr.
7 Morlan's suggestions as to safeguards and controls were adopt-
8 ed, what kind of effect would that have on the pipeline con-
9 struction schedules or methodology?

10 MR. BOUCKHOUT: I believe, Mr. Timmer-
11 mans, it's, most of the points made by Dr. Morlan have already
12 been included in the considerations of our pipeline scheduling.

13 MR. TIMMERMANS: Does that mean that
14 you will have an archeological team there?

15 MR. BOUCKHOUT: We have stated we will
16 have archeologists on the staff when available. We have not,
17 however, gone quite as far as Dr. Morlan has indicated in
18 discussions with our archeological consultants. Our status
19 is that there will be professional archeologists available in
20 those areas deemed archeological sensitive or where the poten-
21 tial for archeological finds are deemed to be significant.

22 In respect to those other areas, we
23 have said that our environmental inspection team would be
24 charged with the consideration of archeological finds and
25 archeological materials during the environmental inspection
26 process. Now the member of that team, or members of that

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Dr. Morlan, Dr. Schilder

1 team who are charged with that would not necessarily be arch-
2 eologists in those areas. They would have professional arch-
3 eologists upon whom they could call if something were discov-
4 ered, but, to date, our position has been, as I've stated,
5 that we would not necessarily have professional archeologists
6 on all spreads at all times.

7 DR. MORLAN: I wish I had thought to
8 bring along some of the ridiculously small scraps that we
9 sometimes base a major find upon. I am concerned about that
10 only because the existence in the ditchwall of a smear of
11 charcoal could be the only evidence in that ditch wall of an
12 archeological site, and yet it could be evidence of a substan-
13 tial site. It might be all you see in a cross-section through
14 the site.

15 I don't know how many non-archeologists
16 would be prepared to make those kinds of inferences and recog-
17 nize that there might be something worth investigating there.

18 DR. SCHILDER: I have personally inter-
19 preted Dr. Morlan's concerns as something which should be
20 projected into construction procedure and construction find-
21 ing, especially it's my personal understanding, especially
22 along the routes very closely routed to major water bodies
23 and along the roads paralleling the existing river system.

24 I have a question in view of that to
25 the representative of Foothills, whether you would consider
26 that there might be a conflict of interest between your

1 company's plan to implement the project economically and
2 effectively from the point of view of other standpoints than
3 the one we just have had?

4 MR. BOUCKHOUT: We certainly, Dr.
5 Schilder, if an archeological site is, if an archeological
6 site were to be uncovered in the course of pipeline ditching,
7 our procedures, as we've stated in the environmental state-
8 ment and developed for us and with us by Dr. Reeves, our
9 archeological consultant, have stated that that site would
10 then be evaluated. If, by our professional archeologists,
11 and I'm sure that when this is done, that staff from the
12 Museum of Man would also be involved, if that site is deemed
13 significant enough to warrant preservation and immediate
14 excavation, that we would, in fact, adopt one of two potential
15 alternatives that I can foresee now, one being that that
16 particular section of the line - and it would be a relatively
17 small section since, as I understand it, archeological sites
18 tend to be quite localized, that that section of the line
19 could be bypassed in a normal construction sequence in order
20 to permit the archeologists time to adequately excavate the
21 site.

22 As another alternative, and this is
23 only another alternative, in that localized situation, de-
24 pending on the extent of the site, that also would have to
25 be determined by the professional archeologists, the line
26 could be, on a localized basis, rerouted once the aerial

1 extent of the site were determined. In other words, it
2 might in fact take simply a re-routing of perhaps several
3 yards, perhaps several hundred yards, but that's a second
4 alternative, and in fact, in order to proceed with construc-
5 tion the alternative would be that the sites could be avoid-
6 ed by a minor re-route in that particular location.

7 DR. MORLAN: Well, if I might comment
8 on that, I'd like to just restate my concerns perhaps a
9 little more briefly so that - I, as I say, I am quite happy
10 with the procedure adopted by Foothills in the event that an
11 archeological site is recognized as an archeological site.
12 The measures are there to ensure that we gain as much infor-
13 mation as possible from such a discovery. My major concern
14 is that archeological sites are difficult to see. It's
15 highly unlikely that the ditcher is going to reveal the
16 horizontal plan of an archeological site. He isn't going to
17 skim the thing off and will have lying there the remains of
18 a prehistoric camp. Instead, it's going to slice right
19 through it and all that will be left is a cross-section of
20 the site and ceiling cross-section archeological sites are
21 just tremendously difficult to recognize.

22 That's why I feel that the experienced
23 eyes of an archeologist is specific work for this purpose
24 are actually needed in the field and it wasn't clear to me
25 that those kinds of arrangements were forecast in that I
26 hadn't heard that the environmental inspection team would

1 likely take care of this and that that team might not in-
2 clude an archeologist. I suppose I'm asking Foothills to
3 consider including an archeologist on that team and I'd also
4 like to ask if you planned to have the ditch walls inspected
5 anyway. My understanding in the Cagsol hearings is that
6 the ditch walls would be inspected by geophysicists , for ex-
7 ample, by ice content specialists who would have a fairly
8 accurate log of those ditch walls in order to anticipate
9 potential maintenance problems and other considerations later
10 and could - I presume that's going to be a very small group
11 of people actually, walking around in that frozen ditch, I
12 doubt if you're going to find many people who want to do it to
13 start with and I shouldn't think that very many people could
14 be fit in there anyway, but is it possible, feasible for us
15 to consider having a person of - a group of people scattered
16 through the construction spreads who are trained for arch-
17 eological, paleontological, paleontoecological concerns to
18 handle all such historical concerns simultaneously.

19 MR. BOUCKHOUT: Yes, I could repond
20 to that, Dr. Morlan. Certainly your point is well taken.
21 I do appreciate that evidence of archeological sites is
22 often virtually non-recognizable, particularly by the un-
23 trained eye. I've experienced this personally in having
24 followed an archeologist around for some time. I fully
25 appreciate that. We will definitely take your concerns into
26 consideration. Certainly it is a possibility that trained

1 archeologists - we had, in fact, intended to have the ditch
2 inspected, that's true, the ditch walls would be inspected.
3 That would be part of the environmental inspection team's daily
4 routine, in fact, to inspect the open ditch as it is opened.
5 We will certainly consider the possibilities, as you've mention-
6 ed them, of perhaps the necessity of including a professional
7 archeologist in fact within the overall environmental inspection
8 team, since, in regards to environmental matters, the archeolo-
9 gical matters are very specialized and perhaps do warrant a
10 specialist in that respect.

11 DR. MORLAN: I think the right personnel
12 could, in effect, be a purely environmental inspector so he
13 fits right in there.

14 MR. CHAIRMAN: Any other comments, any
15 comments from the floor?

16 Mr. Wykes has a question.

17 I'm sorry, I missed Foothills. I'll
18 get right back to you, Mr. Bouckhout.

19 MR. WYKES: It's more a hypothetical
20 question. I'm just thinking that if and when a pipeline were
21 built along the Alaska Highway and a significant archeological
22 site was discovered that traverssed the pipeline right-of-way,
23 Mr. Bouckhout, what kind of problems might there be in terms
24 of doing a major dig in close proximity to the pipeline?

25 MR. BOUCKHOUT: As I indicated a bit
26 earlier, Mr. Wykes, the possibilities, if one were found, a

1 relocation around the site or cessation of construction in the
2 immediate area of the site.

3 MR. WYKES: I was really talking about
4 an operational pipeline.

5 MR. BOUCKHOUT: I wouldn't expect that
6 a major find would, a major site would be found during the
7 operational phase. If it were, there would certainly be some
8 implications relative to any, particularly any motorized exca-
9 vation in the immediate vicinity of an operating line. I'm
10 not aware if anything like that has ever been done or not.

11 DR. MORLAN: I think the question is the
12 site, during ditching that would then be left alone, marked
13 for later investigation because, after all, archeologists don't
14 like to be sand in the wheels of progress. The construction
15 schedule should go on. With that thought in mind, is it pos-
16 sible for us to excavate later, with hand tools, which is our
17 normal procedure anyway, in the vicinity of the line and, if
18 so, can you specify limitations on encroachment toward the
19 line. Obviously we're not interested in digging up the pipe,
20 we're interested in digging up an archeological site?

21 MR. BOUCKHOUT: Yeah, that is certainly
22 a possibility. In fact, I believe that is mentioned in the
23 environmental statement that in some cases, depending upon the
24 nature of the site, under the assessments and recommendation of
25 a professional archeologist, it's conceivable that the line
26 would be installed in the normal course and back-filled and that

1 excavation would follow that after construction had passed
2 that particular area.

3 Now, in terms of timing, again we're
4 speaking of phasing in this pipeline system and phasing-in of
5 the construction sequence. Certainly, if an archeological site
6 were discovered, for instance, in the first 200 miles designated
7 for construction currently in the summer of 1979, that particu-
8 lar section of line is not scheduled, would not be scheduled to
9 be in operation as the entire route would not be scheduled to
10 be in operation until 19 - the fall of 1981. Therefore, we're
11 talking about some two years availability of access to that
12 area prior to any operational pipeline being in that area.

13 The last portion of the construction
14 scheduled is scheduled for the winter of 1981. In other words,
15 January through about April, of 1981, late January through
16 April in that range. That's a fairly small section, which
17 occurs at the north end of the line. The last very major
18 construction, the summer construction, another couple of hund-
19 red miles is scheduled for the summer 1980, so again we have
20 over a year between the time of construction through that par-
21 ticular area and the time that the pipeline would be operation-
22 al.

23 I'm sure, Dr. Morlan, we could specify
24 particular safety precautions if there were to be any excavation,
25 hand excavation or whatever done in the vicinity of an operating
26 pipeline, in other words, a fully pressured pipeline.

1 MR. CHAIRMAN: Now, would you like to
2 comment on the brief Mr. Bouckhout?

3 MR. BOUCKHOUT: I was just going to make
4 one or two comments on issues raised by Dr. Morlan. I think one
5 I already touched on a bit and that is that archeologists would
6 obviously have full access to the pipeline right-of-way. In
7 fact, in scheduling of archeological studies to detail the arch-
8 eological concerns and particularly to discover any sites which
9 are in particular surface sites. It's really a two-phased
10 process. The first phase being done before any right-of-way is
11 open and that is, as I said, primarily a surface investigation
12 which would be carried out ^{at} such locations as river-crossing
13 sites, where there is accessibility essentially.

14 The second phase would then be more de-
15 tailed site investigations on the ground, once a pipeline right-
16 of way is opened so that, and this would be done by professional
17 archeologists and it would be done once you have a right-of-way
18 opened, the trees cleared off so that, again, in this phase, sur-
19 face investigations could be done. This would be done virtually
20 by having professional archeologists walk the entire line in
21 search of any materials which might indicate a site in the immed-
22 iate vicinity.

23 And then, the third phase, if we can call
24 it a phase, really, then becomes the inspection phase once con-
25 struction is underway.

26 And with respect to another point Dr.

1 Morlan did bring up in terms of wood, the kinds of studies that
2 we have done and intend to do with this line, be done on such
3 lines or such potential routes as the Dempster Highway and so
4 on, I might say that if Foothills were to reach a point where it
5 was intended to file an application for a route such as these,
6 and certainly they would be done to the full extent of what is
7 necessary, relative to archeological matters.

8 MR. CHAIRMAN: Any comments from the
9 floor?

10 Would you like to sum-up then, Dr. Morlan?

11 DR. MORLAN: I can sum up by saying that
12 we seem to understand one another and I'm delighted. The work
13 that Dr. Reeves has done for Foothills is of excellent quality.
14 I was aware of his work through its many phases and, in fact, he
15 got most of his actual prehistoric site data from my files, so
16 I can vouch for their completeness.

17 I was interested to elicit discussion of
18 encroachment upon the line during an operational phase and prior
19 to operation but following backfilling. I think we have touched
20 on that now and it probably deserves a bit more consideration,
21 eventually even putting some numbers on that sort of question.
22 Are we talking about excavating within ten feet of the backfill
23 or are we talking about twenty feet or what not?

24 Other than that, I guess it's simply a
25 matter of my - I and my colleagues, doing our level best to
26 ensure that there are enough people trained to do this kind of

1 work when the occasion arises.

2 Thank you.

3 MR. CHAIRMAN: That concludes the briefs
4 for today. We're going to take the opportunity of the time to
5 allow a panel staff to ask a number of questions of Foothills
6 that are on their minds, which they feel are necessary in order
7 to identify the significant issues that they will advance in
8 July in more depth.

9 Mr. Beanlands?

10 DR. BEANLANDS: Mr. Bouckhout, I'd like
11 to pursue for a few minutes terrain sensitivity analysis on
12 the western end of the line, the route. I understand that in
13 the original 42-inch proposal that it was, you expected to chill
14 the line for the first/^{two} compressor stations for a total of somewhere
15 a hundred miles of pipeline. I can understand that because in
16 the documentation which accompanied the major reports, you had
17 reference to soil temperature being quite low for the first
18 100, 140 miles and also in Volume 13, Training Evaluation, there
19 is some very interesting sensitivity ratings which dropped off
20 very markedly after Mile 113. And I'm wondering what transpired,
21 what information came to light to change your mind and drop
22 the chilling at any compressor stations within the Yukon and
23 only have chilled gas running from the Alaska border to compres-
24 sor station one? Particularly in view of the fact that of the
25 ten or so studies you mentioned yesterday that were completed
26 or on-going, none of them were related to terrain sensitivity

1 analysis.

2 MR. BOUCKHOUT: Dr. Beanlands, I'd
3 like to invite Mr. Claridge, who is our geo-technical expert,
4 to respond to that particular question, relative to terrain
5 sensitivity.

6 MR. CLARIDGE: I might begin - I'm not
7 certain of all of the documents you were just referring to, so
8 you may wish to go into some of those further, after I comment.

9 We looked at the possibility of a warm
10 gasline for the entire pipeline route, including the initial
11 110 miles and the effect that a warm line would have on settle-
12 ment and we concluded that in the vast majority of the line,
13 that it would be feasible to operate a warm line from the
14 settlement point of view, that settlements are generally less
15 than is tolerated by the pipeline. This is principally because
16 the depth of sensitive soil containing ice is relatively shallow
17 at most locations. This came out of the 1976 Drilling Program.

18 We advised Foothills at that time from a
19 pipeline operation viewpoint, that, really, there was little to
20 choose between running warm and running cold. If you run cold
21 you get into problems with freezing previously unfrozen ground
22 and blocking drainage and getting into the frost-heave problem
23 that I'm sure you're aware of. Our contention at that time was
24 that the potential effect of frost-heave if you ran cold would
25 roughly, in terms of an order of magnitude, be the same as the
26 problems if you ran a warm pipeline and we felt there is an

1 experienced history with thawing ground. You can predict what
2 will happen.

3 Conversely, when it comes to chilling
4 ground, there is no precedent for the effects of operating a
5 chilled pipeline. There is a considerable amount of work that
6 has been done by both Artic Gas and Foothills on predicting the
7 effects, and I'm sure it's all good work, but the point is that
8 it has not been done and our preference was to stay as much as
9 possible with a warm operation if it was tolerable and this
10 was our viewpoint that it was and when it came to revising the
11 pipe system from the 42-inch to a 48-inch, it simply, quite
12 simply happened that a compressor station fell at Mile 40 and
13 it's, it's really not convenient - I suppose it's possible, it's
14 not convenient to block the chilled portion further north and,
15 as it so happens, the highest ice contents are in the initial
16 ten miles and we felt that certainly that first ten miles
17 should be chilled. We felt it would be possible to design from
18 Mile 10 to 40 for chilling and south of Mile 40 we felt that a
19 warm line would be quite feasible and quite possibly preferable
20 to a chilled line.

21 If you summarize what I'm saying, there
22 are pros and cons of operating chilled or warm. You can list
23 advantages either way. Our instinct is to minimize the amount
24 of chilled line to the maximum degree possible and Mile 40 was
25 ultimately selected and I think it's a good selection based on
26 the data we have.

1 MR. BEANLANDS: Do I understand then that
2 the change in operational mode for about 60 miles of pipeline
3 is not based on any new data, rather just in a change of opin-
4 ion?

5 MR. CLARIDGE: I would say the data are
6 the same as - I would back up one step, we, the Mile 110 was
7 selected for the 42-inch line before the 1976 Drilling Program
8 was undertaken. So, the, when it came to change into the 48-
9 inch line and because of the hydraulics of the system, the com-
10 pressor station locations changed and it allowed, because of
11 the change, either to move the last point of chilling north or
12 south. It couldn't stay at 110 because there was no compressor
13 station there and following the '76 work, we advised Foothills
14 our preference was to go north. That was certainly preferable
15 of going south where the ground is primarily unfrozen and chil-
16 ling would lead to --because of the cross-slopes and extensive drain-
17 age would lead to more problems than if with the warm line.

18 MR. BEANLANDS: One final question be-
19 fore I turn it over to some of my other panel support members.
20 How many drill logs are you basing your operational mode on for
21 the first 100 miles?

22 MR. CLARIDGE: I could count them up and
23 be precise, but I believe it's in the neighbourhood of 65 holes.
24 I could check the exact number but it's in that order.

25 MR. BEANLANDS: Less than a hole per
26 mile, basically.

1 MR. CLARIDGE: Yes.

2 MR. BEANLANDS: Okay, thank you.

3 MR. CHAIRMAN: Before we do turn it over
4 to your fellow staff members, I would ask the panel if they
5 have any questions of clarification on this particular point?

6 Dr. LaCate.

7 DR. LACATE: How difficult would it be
8 to change your mind and put in a chiller at, say, Mile 40 or
9 Mile whatever the next one is, is that expensive? Is it
10 feasible?

11 MR. CLARIDGE: No, I don't believe, I
12 will allow Mr. Bouckhout, certainly, to correct me if I'm
13 wrong, I don't believe there would be a great deal of expense
14 in that. I understand the hydraulics work better if the line
15 is chilled, that you can throughput more gas and I suspect,
16 in fact, it would be economically advantageous to run chill.
17 That's my suspicion, I may be in error, I don't believe it
18 makes a great deal of difference one way or the other.

19 I might repeat and we went through this
20 at some length in the Energy Board hearing, particularly on
21 the Mackenzie Line, that where, where there is a choice of
22 running warm or cold, we feel very strongly that it is better
23 to go with a mode that there is an experienced/by which to
24 predict the effect of the construction and there's no question
25 that the maximum effect of running warm, which is expressed
26 in an amount of settlement, can be predicted. And this is

1 documented through much northern experience throughout north-
2 ern Canada, Alaska and Russia.

3 By contrast, there is just no history
4 by which to predict the effects of frost-heave and in spite
5 of all the fine work that has been done, our conclusion is
6 that it is not possible to predict with the same degree of
7 accuracy the effects associated with chilling and it's as
8 simple as that and I think that our conclusions were borne
9 out on the Mackenzie Line, that from Day 1, we preferred to
10 halt the chilling at Fort Simpson, not run chilled south of
11 there and for roughly two years, we were treated as though we
12 were making a fundamental mistake; that we were thawing far
13 too much ground, but eventually both pipeline companies wound
14 up with virtually the same frost point of cold flow and the
15 prime reason for the switch, certainly on behalf of Artic Gas,
16 was that they accepted that the risks of running chilled in
17 ground that was substantially unfrozen were just too great and
18 they switched to our viewpoint, after some time, I suppose
19 two years, at least after we had picked Fort Simpson.

20 MR. BOUCKHOUT: I'd just to add
21 briefly, that I concur with Mr. Claridge's analysis, that the
22 cost is really not the implication, the cost of the chiller
23 or whatever, the basic decision is made relative to the kind
24 of terrain you're dealing with and the experience you have
25 with dealing with such terrain. Mr. Claridge did make the
26 point that we do have experience with warm gas pipelines in

1 permafrost. In fact, we do, Westcoast Transmission System,
2 in the northern end of B.C in that section of the Quiet
3 Mountain Line which runs into the Yukon and Northwest Terri-
4 tories is, in fact, discontinuous permafrost and does go
5 through a permafrost zone. So, we do have existing experience
6 as to what happens when a warm line does cross permafrost.

7 MR. CHAIRMAN: Dr. Hughes.

8 DR. HUGHES: Am I understanding correct-
9 ly that there is no possibility of having a chilling unit
10 except at a compressor site? See, you have, as I understand
11 it, your compressor sites are dictated by hydraulics in the
12 line; where you want to stop chilling is dictated by the
13 terrain conditions, which in turn are dictated by climatic
14 factors and so forth. Now, it seems to me that if you have
15 spacing of your - if you must tie the chilling unit to the
16 compressor, then you're talking about the finest cut you can
17 make on whether you're going to stop chilling, is where
18 there's a compressor site, which, you know, when we're talking
19 about 50 - 75 miles between compressor sites, this seems like
20 a, as though it's sort of a pretty crude choice.

21 MR. CLARIDGE: I'm sure, Dr. Hughes,
22 that if there were a clear-cut milepost such as Mile 20, about
23 which was clear-cut it should be maintained chilled and
24 clear-cut below that that it should be maintained warmed, that
25 if the reasons were good enough that a gas heater could be
26 installed. I'm sure there's no question about that, but there

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1 no, there is no clear-cut point that such a heater should be
2 installed and Mile 40, from our standpoint, was, is equally ac-
3 ceptable to Mile 30 or Mile 50. We simply don't have reasons
4 good enough to make an other choice at this time. Mile 40 does
5 represent a convenient point because a station is there, the
6 access roads will be built, facilities are there and we have no
7 objection to that. In the future, if there came to light a
8 clear-cut reason to install a heater at a point north or, to do
9 something different, and perhaps some such reason would come out
10 of that intensive final design investigations, I'm sure that an
11 alternative would be examined, but, at this point, and it's
12 still has to be considered in the terms of a preliminary design,
13 Mile 40, at the site of the compressor is, from our point of
14 view, a good selection.

15 DR. HUGHES: Thank you.

16 MR. CHAIRMAN: Mr. Beanlands.

17 MR. BEANLANDS: I have one question
18 further to that. Would it be possible during the actual trench-
19 ing to change your mind once again on the location of a cooling
20 station at a compressor. For example, suppose you run into a
21 lot more ice than what your very sporadic drill holes have indi-
22 cated, then is it a major change in design to add a cooling sta-
23 tion at the, say, first or second compressor station, which you
24 don't plan to now?

25 MR. CLARIDGE: I think you'd have to
26 make that decision based on intensive drilling that would be done

1 during final design. What's in the ditch wall itself, even if
2 it's massive ice, would not control the settlement that would
3 accrue to melting. The settlement is beneath the length and
4 what's in the walls wouldn't affect that settlement so, in that
5 portion, there really would have to be sufficiently intensive
6 drilling to come to that point of selection of last point of
7 cold flow in advance of construction.

8 MR. BEANLANDS: But the gist of my ques-
9 tion is that you maintain a certain degree of flexibility in
10 the location of cooling stations, is that correct?

11 MR. CLARIDGE: At this point, I adopt
12 that argument that there has, there has not been a definitive
13 amount of work done to, for final design purposes to finally
14 select that point, but on the basis of what we presently have,
15 it's a good point. I should emphasize that a considerable
16 amount of geotechnical fieldwork would have to be done prior to
17 construction and in all cases, chilling cut-off, slope stability,
18 erosion, frost heave control, all of these matters require a
19 great deal more work. What's being done now is simply to, to
20 permit the preliminary design and the selection of a feasible
21 route to be formalized before these hearings.

22 MR. CHAIRMAN: I have a question. As I
23 understood you, you indicated that the affects of the heated
24 gas in a gas pipeline in permafrost are relatively well known.
25 Could you describe for me, in layman's terms if possible, what
26 would likely happen with a pipeline crossing an area as repre-

1 sented by, say, Drill Hole J.1. You have a line map from
2 that there. Maybe you could describe to us what the classifi-
3 cations are, what the ice content is and what it represents and
4 what would likely happen to the terrain in the event of placing
5 a heated pipeline in that location?

6 MR. BOUCKHOUT: We have fifty copies of
7 the report I referred to this morning, available now, for the
8 Panel.

9 MR. CHAIRMAN: Thank you. Do you mind
10 just giving it to the Secretary or --also, if you want to pick
11 out a couple -- J.1 and L.1 -- how is that?

12 MR. CLARIDGE: There is a report that
13 I don't know whether you have with you, Dr. Hill. It's a -- report
14 ing a series of consolidation tests from selected test holes in
15 the 1976 program and the predicted settlement was reported in
16 that report. I can clarify it with Mr. Bouckhout now or after
17 -- whichever you prefer -- if that has been filed and what he
18 wishes to do with it.

19 MR. CHAIRMAN: Yes, I remember reviewing
20 that report, yes. We'll declare a five minute stretch break
21 while you look up your data, okay.

22 (PROCEEDINGS ADJOURNED).

23 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT).

24 MR. CLARIDGE: I might begin, Dr. Hill,
25 by explaining a little of the background in conducting the
26 Drilling Program that we were just referring to.

1 We did a preliminary reconnaissance
2 of the route shortly after Foothills began to proceed with
3 its application and at that time, we identified the initial
4 hundred miles as a portion of the route that had relatively
5 widespread permafrost and merited a considerable amount of
6 attention in what I refer to as the preliminary design and
7 route location phase.

8 In the initial hundred miles, I
9 indicated that approximately sixty-five or seventy drill
10 holes were spotted to give us some indication as to the
11 magnitude of problems that there might be. The extent of
12 permafrost, whether permafrost was present, the ice content.
13 In the case of the Haines-Fairbanks products lines, whether
14 permafrost had melted from that route. In other words, to
15 provide us with the type of data that were necessary to pro-
16 ceed with an application.

17 To my mind, the extent of drilling
18 done there was quite intensive and at least as intensive as
19 anything done on the Mackenzie Valley route by either
20 applicant. We were quite happy with this work. At the same
21 time, I might emphasize that only the drilling done was only
22 sufficient on which to base an application and by no means,
23 is it intended to be the data base for a final design.

24 We have -- or Foothills have -- at
25 its disposal, a minimum of two years available for proving
26 up a final design and in that process, in addition to further

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1 drilling on the existing alignment, alternate alignments
2 within the corridor will be examined to put the pipeline out
3 of individual positions where there are obviously problems
4 and when you pointed to hole J.1., that is exactly an area
5 that would have to be located out of or a special type of
6 design would have to be conducted to answer your question.

7 In hole J.1, we did do a settlement
8 analysis of the material at that location. It's an outwash
9 with a peat covering. Indicated on the terrain sheet, is an
10 OWPT and we predicted that if the pipe were buried to its
11 conventional depth of seven feet, that the settlement would
12 be somewhere in the order of seven to eleven feet and
13 obviously, that's not acceptable.

14 If a deeper mode of burial were
15 considered, involving burying the pipe to a depth of fourteen
16 feet, we predicted a settlement of between five and eight
17 feet and again, that is not acceptable.

18 MR. CHAIRMAN: Could I ask -- settle-
19 ment of the pipe itself or of the surface?

20 MR. CLARIDGE: Yes, of the pipe
21 itself and at the surface it would be probably another foot
22 in that order, so at that point, as indicated in the sub-
23 sequent report by ourselves entitled 'Anticipated Thaw
24 Settlement along the Foothills (Yukon) Pipe Line Route' it
25 is indicated in that area, that another mode would have to
26 be examined.

1 In this case, it would have to be
2 either a much deeper burial to support the pipe or a relocation
3 or a special support mode. My feeling would be that that
4 particular deposit of peat could be avoided, just examining
5 the terrain sheet here, and I can't see that would be par-
6 ticularly difficult at that location to avoid that deposit.

7 MR. CHAIRMAN: Could I clarify
8 part of your answer. Say that if it had to be crossed or
9 an area like that had to be crossed, one way to do it would
10 be to bury it very deep, presumably, so there wouldn't be
11 more than some specified limit of settlement in the pipeline.
12 Or else, support it presumably on piles or something like
13 this in the trench eh? What -- the surface though, would
14 still degrade a great deal in that situation if you buried
15 it fourteen feet, would you estimate that the whole distance
16 between the pipe and the surface would in fact thaw?

17 MR. CLARIDGE: In the options that
18 you spoke of -- deeper burial or a pile support -- the surface
19 definitely would settle and ponding would follow. That will
20 happen and the design will have to incorporate erosion preven-
21 tion measures to eliminate the potential adverse effects
22 associated with settlement.

23 The minimum effect will be, there
24 will be ponding developed now, what the designs must do, is
25 to eliminate any erosion or siltation of stream bodies that
26 might follow thermokarsting -- that would follow that, but we

1 must accept that there will be degradation and ponding on
2 the right-of-way associated with the construction and the
3 warming effect.

4 MR. CHAIRMAN: Okay, how about
5 L.1. It's in the back side of Pickhandle Lake. How do you
6 avoid it at Pickhandle Lake?

7 MR. CLARIDGE: The hole L.1 is
8 in what's referred to as a coalescing alluvial fan, referred
9 to as a CAF with a peat cover and it's interspersed with
10 outwash, with a peat cover. The prediction of settlement
11 at that point is if the pipe were buried to a depth of seven
12 feet, the pipe would settle by seven feet and that's not
13 acceptable.

14 If the pipe were buried deeper to
15 fourteen feet, the settlement would be reduced to about a
16 third of a foot and that is acceptable from a pipe integrity
17 standpoint. At the same time, the ground surface itself would
18 settle and a small pond would form along the right-of-way,
19 over the pipe.

20 MR. CHAIRMAN: I have about six
21 feet of peat and to the 14.2 foot level, you have ice, is
22 that the same drill hole? And then at the fourteen foot
23 level you run into sands and then bedrock(?) at about
24 eighteen feet?

25 MR. CLARIDGE: That is correct sir.
26 The concept in that case would be to bury the pipe to the top

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1 of the sand at depth fourteen feet.

2 MR. CHAIRMAN: So the integrity --
3 you could solve the problem of the integrity of the pipeline
4 by burying it, but you'd still have fourteen foot or some
5 such, somewhere -- some level of degradation --

6 MR. CLARIDGE: There would be a
7 depression and obviously, you would not backfill the ditch
8 with the icy material that came out. In that case, an ice-
9 free backfill would be put in, so it would not settle
10 directly over the pipe by that amount.

11 MR. CHAIRMAN: But by right of --

12 MR. CLARIDGE: I think a realistic
13 maximum -- I would say on a settlement over the width of the
14 right-of-way would be in the order to two to three feet.
15 That would be my feel for what would accrue by the time you
16 backfilled with an ice-free material. You're not going to get
17 that amount of settlement, but there will be a thaw bulb
18 develop around the pipe and certainly there will be in the
19 range of several feet of settlement. Providing there is
20 no drainage out of the area, there will be a small pond
21 develop there.

22 MR. CHAIRMAN: Any follow-up
23 questions from the Panel? Mr. Trevor?

24 MR. TREVOR: In forecasting the
25 amount of settlement, how much is due to the fact of digging
26 the trench and disturbing the ground and how much is due to

1 the heat from the pipeline itself. Are you able to make that
2 kind of estimation?

3 MR. CLARIDGE: The area in question
4 is in a -- it's in the southern fringe of the discontinuous
5 permafrost zone. The ground temperatures are inching up
6 towards freezing. They're still several fahrenheit degrees
7 below freezing, but it's getting into a metastable situation.

8 The effect of ground disturbance
9 associated with the pipe itself will cause degradation,
10 removal of the tree cover, the removal of the shading effect
11 of trees, the disturbance of the pipeline will lead to
12 degradation.

13 In addition, there is the effect of
14 the warm pipeline on adding to the warming effect and as a
15 first guess at it, it's really not necessary to be highly
16 theoretical about it. You could be, but our guess is that
17 the warming effect from the two causes will be enough to
18 degrade down to a thaw stable material. In the vast majority
19 of these holes, stable materials, gravels and glacial tills,
20 where encountered within fifteen to thirty feet from the
21 ground surface and our conservative assumption has been that
22 that material can thaw out and let's assume it will.

23 You could go one step further and
24 impose a theoretical solution. You might find that instead
25 of going to the full depth of twenty feet to thaw stable, it
26 might only go eighteen feet, something like that. But, we

1 feel that the difference isn't significant.

2 MR. TREVOR: But your basic
3 argument though in deciding what are unchilled and what are
4 unwarm, is based on the amount of permafrost present, isn't
5 that correct?

6 MR. CLARIDGE: No sir, I would
7 not say that is the basic -- it would rather be -- the way
8 we would look at it is -- what are the effects of warming
9 the permafrost, even if an area were a hundred per cent
10 permafrost on the surface, if the material were free of
11 ice at shallow depths and would not be -- would be affected
12 by transformation to a warm condition, then our advice
13 would be that we see relatively little effect of warming.

14 That is really what we want to
15 examine. The effect of warming permafrost and how much ice
16 is present, how much thawing can occur, to what depth is
17 the effect of doing so, equal to or worse than the effect
18 of running a chilled pipeline. That's your option in
19 creating effects in the unfrozen portions. This is just
20 continuous permafrost in this area and you must consider
21 that, whichever way you run, that you must look at the
22 effect. If you chill unfrozen ground, what is the impact
23 on interrupting ground water that passes the pipeline. Can
24 you cause icings that could cause blockage of drainage
25 courses and diversions.

26 This type of thing must be looked

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1 at in a total context when deciding which mode of temperature
2 -- whether to operate above or below freezing.

3 MR. TREVOR: I didn't mean to
4 suggest that it was purely permafrost as opposed to non-
5 permafrost, that type of permafrost which would be
6 susceptible to action. You just then now, referred to the
7 chill section and I understand from your final argument to
8 the National Energy Board, that in terms of the chilled
9 section of the line, you would be looking to insulation to
10 deal with the opposite problem, where you might have a
11 frost buildup. Is this correct?

12 MR. CLARIDGE: This is correct.
13 Mr. Bouckhout might wish to confirm that.

14 MR. TREVOR: It was stated that
15 this could either be as insulation applied to a pipe or
16 as insulation applied to the walls of the trench.

17 MR. BOUCKHOUT: That's correct,
18 Mr. Trevor.

19 MR. TREVOR: What type of insul-
20 ation we are thinking about in terms of having it on the
21 walls of the trench rather than on the pipeline -- on the
22 pipe itself.

23 MR. BOUCKHOUT: As I recall, and
24 I haven't -- you know, this is fairly technical engineering
25 detail which I haven't been inherently involved in. As I
26 understand it, the kind of material that is being evaluated

1 and being looked at now, is a styrofoam kind of material
2 that has fairly high tensile strength and it would be put
3 down in the trench, both the trench bottom and the trench
4 walls.

5 It's really a matter of determining
6 ease of installation and effectiveness of either utilizing
7 a jacket kind of insulation over the pipe itself, which
8 would be in some respect, similar to what has been used on
9 the Alyeska's pipeline where they've developed a jacket
10 insulation for the pipeline, as opposed to utilizing more
11 in terms of a slab kind of insulation which be installed
12 in the trench.

13 So, one would be installed in the
14 trench with the pipe installed therein. In the other
15 case, it would be installed on the pipe as a jacket. I
16 might add that in terms of frost heave, wherever you have
17 a chilled gas pipeline in non-permafrost areas, you do not
18 necessarily have a frost heave problem.

19 There are certain criteria necessary
20 with respect to frost heave which indicate to you whether
21 there is a potential for the frost heave phenomenon or not.
22 If you'd like further clarification on that, perhaps Mr.
23 Claridge --

24 MR. TREVOR: No, I just wanted
25 clarification on the insulation and your argument that you
26 feel that will inhibit frost heave to a point where it's an

1 acceptable amount.

2 MR. BOUCKHOUT: That's right.

3 MR. TREVOR: Is this also true
4 of the Alaska portion of the line or do you know?

5 MR. BOUCKHOUT: I personally don't
6 know what the people from the Alcan pipeline company --
7 what methodologies they are going to be using in this con-
8 text. I really don't know.

9 MR. TREVOR: I think we've made
10 reference to this point before, what the design parameters
11 on the Alaskan portion of the line may be of great interest
12 to us and to -- what is the possibility of getting access
13 to this type of information.

14 MR. BOUCKHOUT: I'll certainly
15 check on that, particularly with respect to the filed
16 documents. I am sure they would be available and I'll have
17 to check on it.

18 We will undertake to acquire and
19 provide for the Panel, copies of the Alcan filings within
20 which these kinds of matters will be treated.

21 I might make one further comment.
22 Actually, in looking at the alignment sheets -- the photo-
23 mosaic sheets which have been terrain typed -- it's -- just
24 by looking at it, it's obvious that the various terrain
25 units are quite small. I believe Mr. Claridge indicated
26 that part of the final design process is to do very detailed

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1 geotechnical drilling. By detailed, I mean several holes
2 per mile as opposed to the less detailed drilling that has
3 been done to date. The more detailed drilling being necessary
4 for the final design process.

5 If, during that final design
6 drilling, it's found that the current routes does not in fact
7 pass over certain terrain units which are of high ice
8 content and would be jeopardized by hot soil or a one-gas
9 pipeline rather, certainly one of the measures which is taken
10 is to relocate around these relatively small pockets of
11 terrain, around these relatively small units. It's something
12 that's a fairly conventional means of doing things.

13 We talked earlier about flexibility
14 and one must maintain this kind of flexibility throughout the
15 planning and construction phase so that you can, in fact, a-
16 void these kinds of things as you become aware of them. And
17 through the/^{detailed}geo-technical drilling is one means whereby you
18 do determine the precise condition in geo-technical terms of
19 your line and that gives you the option then, once you've in-
20 vestigated the results of those drill holes, to, wherever you
21 find you are in difficulty, to align around those particular
22 units.

23 MR. SCHILDER: Mr. Chairman, I
24 have a supplementary question. I would like to know how well
25 are the natural thermal conditions below the ground documented
26 within the proposed right-of-way along the proposed pipeline

1 route, in general, and especially within the route of the
2 first 40 miles from the Alaska boundary which is proposed for
3 chilling?

4 MR. CLARIDGE: There were a number
5 of your misters installed in selected test holes in the 1976
6 program. I don't have the results with me, but I'm sure be-
7 tween myself and Mr. Bouckhout, that we could make them avail-
8 able in the next few days. My recollection is that the mean
9 temperatures are somewhere around 27 degrees Fahrenheit, in
10 that northern 50 miles, but we do have some data that can be
11 presented to you.

12 DR. SCHILDER: Have this data been
13 used also for a change in your chilling concept?

14 MR. CLARIDGE: Not as such. It
15 really is not the key factor in deciding the cut-off point.
16 It is basically - we're discussing 110 miles, really. I don't
17 think there's much question that you can go south of Mile 110.
18 We're into predominantly unfrozen ground and you can't go
19 north of Mile 0, obviously, it's into Alaska. The option that
20 essentially we saw in our studies and I say we, Klon Leonoff,
21 who did the geo-technical study, was that we saw no obvious
22 preference for running either warm or chilled and we felt that
23 a very detailed study, including an analysis of temperatures,
24 was not warranted at this point. We concurred that Mile 40
25 was a, it was within the range of Mile 0 to 110. I mentioned
26 earlier that we had a basic preference if we can run warm,

1 because of the experienced history - not just with pipelines,
2 but with construction of all types, especially building found-
3 ations in the north, the experience in predicting settlement
4 is well established and our bias, if you like, was to run
5 warm as ^{north} far as could be and, at this point and considering
6 the number of miles that we're considering and the status of
7 a preliminary design, we felt that it was simply not warranted
8 to pursue the matter any further. It certainly would be,
9 though, in the final design phase when considerably more test
10 hole and temperature data have been gathered and particularly
11 when an exact routing has been made. There's no point in
12 looking at specific points presently on the route that might
13 be problems when the exact final route has not been determined
14 and, certainly, a good many of the problems, minor problem
15 areas that we see now can be located around. We have simply
16 done the studies to this point to say that, yes, it is a fea-
17 sible route, the problems can be counteracted in this way and
18 that way and that's all that we feel is necessary at this
19 stage in preparing a design.

20 DR. SCHILDER: One more question,
21 please. Has your cut-off point for chilling been also select-
22 ed for a simple reason based on the topographic conditions
23 beyond the point, beyond Mile 40? Mile 40 roughly coincides
24 with the western bank of the White River and, as we know,
25 beyond that point within the next roughly 60 miles, there are
26 three significant major river crossings. Has this fact been

1 taken into account for a decision about?

2 MR. CLARIDGE: I think that is an
3 advantage that, obviously in the riverbeds, notably the Donjek
4 and the Duke. South of the White River there will be unfrozen
5 material and there would be a concern about blockage of drain-
6 age in those rivers if the pipe were run chilled.

7 On the other hand, the mapping in-
8 terpretation, as well as the drilling, indicate that the bed
9 materials are quite coarse and the effect of chilling would
10 not be that pronounced. The frost, susceptible soil type is
11 not present and material to considerable depth is quite coarse
12 and flow - the potential for flow obstruction should not be
13 very great, but still, the preference is there if we can to
14 run warm across riverbeds. So that would be an advantage to
15 retaining the cut-off at Mile 40, or perhaps a little north
16 of that.

17 DR. SCHILDER: Would you consider
18 the present existing cut-off point for chilling a flexible mat-
19 ter in view of potential new geo-technical data, which may be
20 available from further investigations?

21 MR. CLARIDGE: I would agree with
22 that, uh, it's flexible. That would be my advice to Foothills.
23 Mr. Bouckhout might take that a step further as a policy, but
24 I certainly would recommend to Foothills that the options re-
25 main open. I believe, from another aspect, that the final
26 hydraulic designs, the final routing has not been done, either

1 in Alaska or Yukon, and it's entirely conceivable that, with
2 routing refinements and hydraulic refinements, that compressor
3 sites are going to change and Mile 40, at this point, is by
4 no means a final selection point.

5 At the same time, geotechnical
6 programs will be on-going. There will be many considerations
7 and I'm sure that are fed into the final design of the system
8 and chilling will be one of the matters that I'm sure will be
9 subjected to much more evaluation. We're still at a point
10 where the options are open.

11 DR. SCHILDER: Are you implying by
12 that that the final, or, the final decision about a chilling
13 cut-off point would be a matter of further considerations and
14 studies and, if possible, studies in autonautics?

15 MR. BOUCKHOUT: Now, I'm not totally
16 sure, Dr. Schilder, what you mean by possible alternatives,
17 but certainly, as more data is gathered, you must re-evaluate
18 the data and if your original conclusions should be revised for
19 whatever reason, then obviously, you know, as you go through
20 the detailed planning process and the build-up in the planning
21 for the final design that you implement the data. There cer-
22 tainly is no point in freezing a particular design element at
23 this stage, leaving yourself absolutely no flexibility to be
24 able to react to the detailed information, as it's gathered.

25 You know, we certainly maintain the
26 flexibility. When Mr. Claridge was speaking of route changes

1 and so on and it's similar to what I was speaking of in terms
2 of aligning around these small pockets of high ice content
3 soils and so on.

4 MR. CHAIRMAN: Could I ask a ques-
5 tion? The current stand that, although we can pick out areas
6 on the map, drill holes on the map and so on that are of great
7 concern and unacceptable for the proposed type of pipeline that
8 you propose to build, type of construction and depth of burial
9 and so on, that your hypothesis is that, in fact, as I under-
10 stand if, that in fact there are ways around these areas.
11 Two alternatives, reroute the pipeline onto areas with shallow-
12 er, stable materials, or do some other type of construction
13 with piles and so on in the ditch.

14 However, it leaves us with difficult
15 dilemma. How do you propose to convince us that in fact these
16 alternatives are possible? That it's possible to build a pipe-
17 line through that area from the 40 milepost on, wherever the
18 chilling, wherever the heating station is, within the next
19 month? We have to, of course, make a judgment, a recommenda-
20 tion whether or not it's possible to construct that line envi-
21 ronmentally safely. This is obviously a point that the staff
22 has picked out as one of the potential significant environmen-
23 tal concerns and I believe it's fair to ask Foothills how they
24 propose to convince us that, in fact, it is possible.

25 MR. BOUCKHOUT: Well, to begin an-
26 swering your question, Dr. Hill, I think we can immediately

1 look at experience of not only pipeline construction in simi-
2 liar areas, which is obviously relevant. The kind of area we're
3 dealing with along the route in Yukon is not materially differ-
4 ent than a good portion of other systems built in northern
5 British Columbia. As an instance, I've come back to that se-
6 veral times, but again, there's a, the relevance is there.
7 We're dealing with the discontinuous permafrost zone. We're
8 dealing with big inch, very large diameter pipelines running
9 through discontinuous permafrost. They are not chilled, they-
10 're running warm. We have, additionally, in Yukon, other
11 construction experience with other civil construction projects.
12 Granted, they might not necessarily be pipeline projects, but
13 they are also ground disruptive projects with respect to high-
14 ways and so on. And I think it's necessary to look at the
15 experience of civil construction in the immediate vicinity and
16 what the implications and results of those kinds of ground
17 perturbations or whatever one might want to call them, has
18 been on the terrain, the local terrain.

19 MR. CHAIRMAN: Right, basically
20 though, we're waiting to be shown. We would like the argu-
21 ments put forward in a technical manner that, in fact, this
22 experience that you're referring to is applicable and we would
23 like the arguments put forward so that we can, in fact, make
24 a judgment, based on the best available information which
25 you're referring to, towards the end of July.

26 MR. BOUCKHOUT: As I understand the

1 process, Dr. Hill, this, as you've indicated, is of signifi-
2 cant concern to the panel and to the panel staff and, as I
3 understand it, the second phase of this particular proceeding
4 is to really delve into the explicit details.

5 At this stage, unfortunately, we
6 do not have all the potential support staff, support informa-
7 tion and so on available to us, this week, that could explain
8 in some detail some of the additional implications and infor-
9 mation and design parameters and so on, which we certainly
10 would make available when we discuss this as a particular to-
11 pic.

12 MR. CHAIRMAN: Fine.

13 Mr. Hughes.

14 MR. HUGHES: I just wanted to raise
15 the point that follows immediately on your comment about what
16 the, what can be learned from previous civil construction ex-
17 perience. We've had reference, yesterday, to requests for
18 additional information. The, on the 24th of May, Mr. Windmill
19 asked you for specific discussion on some aspects of the, of
20 this point.

21 We realize you haven't had time to
22 respond yet to those specific questions, but could you outline
23 for us now, just in general, the kind of study that you took
24 of the existing pipeline, the existing highway, the borrow
25 pits along the highway, foundation problems perhaps associated
26 with the pumping stations of the existing pipeline? Anything.

1 That type of study that gives us some feel for the kinds of
2 problems that were involved?

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1 MR. BOUCKHOUT: In the terms of
2 studies which have been done, we have in fact looked at the
3 Haines-Fairbanks products line as we previously indicated.
4 We've drilled geotechnical holes on the line. We have had
5 people involved in a reconnaissance of the line, stopping at
6 various places to gather information primarily in more of a
7 qualitative sense, rather quantitative sense necessarily, on
8 what the ultimate results, on a comparative basis, on
9 comparing the line, the right-of-way, and so on, with adjacent
10 areas through, primarily through visual inspection.

11 I think certainly the information,
12 there is a fair bit -- body of information with respect to
13 geotechnical drilling and so on, relative to the Alaska
14 Highway. We have gotten some, and perhaps Mr. Claridge
15 could speak to this in more detail, there is a fair body of
16 information available, relative to the design and the
17 maintenance of the highway and what kinds of problems were
18 encountered in not only construction, but particularly in
19 long term maintenance through this particular area.

20 MR. CLARIDGE: I would just like
21 to say that the amount of quantitative data that one under-
22 takes to supply is dictated by the qualitative evidence.

23 Now, in the case of the highway,
24 we did consult people who were with, or had worked with
25 the Public Works Department for quite a number of years,
26 consulted them concerning problems they had had with perma-

1 frost degradation, with springs and icings; we had one of
2 those people with us at the time reconnaissance was able to
3 point out the problem areas. We were able to relate those
4 problems to what could be anticipated with the pipeline.
5 We conducted a reconnaissance of the Haines right-of-way,
6 any point where there had been a distress, an erosion, or a
7 slump, we investigated, and we came to the conclusion that
8 the highway had been performing quite satisfactorily. The
9 Haines-Fairbanks products line right-of-way was in, generally,
10 99 per cent of the area, in good shape. Where there were
11 problems, we had no doubt that the tools were at hand to
12 resolve them on a site specific basis. All that was
13 required was to conduct the final routing studies and the
14 drilling and all that goes along with that in coming up with
15 a final design.

16 At this point, we saw no
17 advantage in proceeding further with further site specific
18 information when the tools to handle all of the problems were
19 clearly defined, and the feasibility of the route had been
20 clearly established, would simply not have been necessary for
21 Foothills to proceed further at this point. We are confident
22 that what is in the documentation of the line at this point
23 is sufficient on which to evaluate the pipeline and determine
24 that it is feasible.

25 As far as precedent is concerned,
26 we have relied very heavily on the experience of the Trans-

1 Alaska pipeline on resolving problems which are, in every
2 case, as severe, more severe than anything that is encountered
3 on the Yukon line. We have a member of our staff who was
4 on the review team for the Alaska project for a period of
5 two years and is intimately familiar with all of the problems.
6 He has been recently involved with this pipeline route and
7 nothing he has said has convinced me that there is any
8 problem here that has not been resolved many times on the
9 Alaska pipeline; the experiences there. The documentation of
10 how that experience is to be applied, I think, has been made
11 in the documents.

12 Perhaps we have not brought them
13 all to your attention, and perhaps there has to be further
14 explanation but that's --

15 MR. HUGHES: Well, really in the
16 report -- you know, in your presentation I see no discussion
17 of the -- no description of the existing pipeline, no
18 discussion of the kinds of the few slope failures that have
19 occurred on there, and I see no discussion of some of the
20 problems that have occurred of subsidence along the line,
21 concentration of drainage along the line due to that
22 subsidence; erosion following on that concentration of
23 drainage and in effect, no sort of looking to see what had
24 happened on the existing line and then sort of seeing an
25 influence of that on those observations in your approach to
26 design?

1 MR. CLARIDGE: I suppose much of
2 that material is so --

3 MR. HUGHES: It may well be
4 hidden in there, but one would like to see that -- be assured
5 that that information that is available from the existing
6 line has been incorporated. Now you can see on the line as
7 you fly over it, I point to one spot on the line, for
8 instance, your whole A-5 in the log of the whole, it indicates
9 that you were drilling the hole close to a deep gully, I think
10 it states in the log, caused by erosion along a cat track.
11 Now, you can see that along the line itself, the, along the
12 existing line itself in that area there seems to be no
13 erosion yet when you look at what's happened along that
14 cat track, you can see, even on your alignment sheet, that
15 there is deep erosion. There seems to be considerable
16 thermal degradation. It looks to me as though as
17 there is an icewedge polygon system melted out there.

18 Is your line going to be more
19 comparable to the existing pipeline, or is the degree of
20 degradation going to be more comparable to what took place
21 on that cat line, and what can be learned from examination of
22 this? I would guess the existing pipeline is an exceedingly
23 passive thing, not even buried, and I would guess that if
24 you're operating with a warm line, you know, in a situation
25 like that, that your situation -- your effect is going to be
26 closer to that of that cat line and what are the measures that

1 you're going to -- how did it happen and what do you propose
2 to do to prevent that? It's just that I don't see it stated
3 anywhere just how these -- what you've learned from the
4 existing civil construction has been incorporated in to the--?
5 I'm not questioning that it's there, but it would be helpful
6 to me, or assuring to me, that it had been incorporated in to
7 the thinking about design.

8 For instance, when you talk about
9 the degree of degradation along the line, is there any
10 difference in the buried portion of that line, are there not?
11 And is there any difference, what is the difference in degree
12 of degradation where it's lying passively on the ground as
13 opposed to where it's buried and with presumably warm oil
14 in the line? Can this sort of observation give the panel any
15 feel for what the problems are, as opposed to just talking
16 about, you know, consolidation results and so forth.
17 It does seem that we have to get some sort of visual feel for
18 what this looks like.

19 MR. CLARIDGE: There has been no
20 formal report authored by our Company on the products line.
21 We do have an extensive body of notes in house, on which we
22 did develop the design and concept. Now, the observations
23 were shared by other disciplines with the Foothills team that
24 was a multi-discipline reconnaissance, and I am not aware of
25 whether a single report as such had been prepared at that time.
26 I suppose one could be, but it just wasn't done. It was an

1 observational process. At the time of the application,
2 proceeded along with the quantitative results of the drilling
3 program in to a designed document. I suppose in retrospect
4 it would have been good to have made up a document with the
5 observations -- the type of observations that you are referring
6 to, and I suppose that can still be done. But it hasn't
7 been, but all of that type of observation has been incorporated
8 in to the design. For example, the reference that hole A-5
9 is certainly, it was an area that was detected at the
10 beginning of the reconnaissance as being an extremely ice
11 rich and sensitive terrain and remarkably so, because it's
12 simply in that area, only in that area I might say, that such
13 extensive disturbances were observed. That's the reason the
14 drill holes were put there, was to quantify the material and
15 the ice contents that were there.

16 The conclusion that we reached
17 from the drilling in that portion was that chilling must
18 continue to at least approximately mile 5 because of that
19 area. So we have taken that into account in the pre-design.
20 Further than that, we have not proceeded in preparing a
21 document.

22 Perhaps Mr. Bouckhout could
23 follow along what I have said.

24 MR. BOUCKHOUT: Actually, Dr.
25 Hughes, there is not a great deal that I could add to that.
26 I guess it's a matter of the various professionals in their

1 various disciplines, looking at such things as the existing
2 Haines-Fairbanks products line which Mr. Claridge has just
3 discussed. From their own disciplinary perspective in reviewing
4 that, then inherently applying what they personally learned
5 from that in the design of the particular line in the
6 assessments of the particular line we are talking about.

7 As Mr. Claridge has mentioned,
8 we have no very detailed reports in retrospect, perhaps it
9 may have been a thing that we could have considered. From our
10 perspective, it's a matter of looking at the situation. The
11 line is there, it's there for -- and I think it would probably
12 be a good idea for the panel if they were to have the time
13 to take the opportunity to go to the existing line and so on,
14 and view in much a similar manner as what we've done. In
15 terms of quantifying information, and preparing a report, as
16 Mr. Claridge said, we didn't feel it really necessary. We
17 viewed the situation on the line and then applied what we
18 learned there as professionals in the various fields to
19 particularly relative to the physical matters, in terms of
20 geotechnical information and so on to our assessment and our
21 workings on the proposed line.

22 That's essentially, all I can
23 give you.

24 MR. HUGHES: Thank you. Oh, just
25 one moment. There was some other questions in this one lot of
26 questions. Just so that the public is aware of the transactions

1 between the panel and yourself, I just wanted to indicate the
2 kinds of request for supplemental information that were made.
3 One was for performance data on the Haines-Fairbanks products
4 line -- the sort of thing we've been talking about here.
5 Another one relating to your departures from the highway,
6 part of that question has been answered -- was answered --
7 that was answered partly by Cagsol yesterday. They use
8 somewhat different criteria to those that we had asked for
9 but that question was partly answered.

10 I think that they indicated that
11 there were major departures from the highway, along twenty per cent
12 of it's length, but your reply would still be useful to us,
13 because our categories were somewhat different.

14 MR. BOUCKHOUT: Yes, you have the
15 reply.

16 DR. HUGHES: There were other
17 questions, specifically related to the utilization of the
18 existing Haines-Fairbanks pipeline right-of-way. I might
19 say now that the -- probably the most common comment we have
20 had from -- in visiting communities is that they cannot see
21 why a pipeline should go anywhere other than on the existing
22 pipeline. Unless there was some real reason not to.

23 Now, I suspect that this concern
24 is as much for aesthetics as for other aspects of the
25 environment, but I think for a lot of these people they are
26 seeing their wilderness disappear and they feel strongly about

1 this point. So I think it perhaps fair to point out to you
2 now that this has been one very common expression of opinion
3 from the communities.

4 Another one related to seismicity
5 and faults. We've had some discussion on our very first
6 meeting here in Whitehorse on this problem of design for
7 faults. But there's more than the problem of design for fault;
8 there's the problem of locating the faults, and a sizeable
9 length of the pipe is in the Shakkwak Trench, known to be a
10 major fault zone and with some continuing fault activity
11 either on or somewhere near it, and the panel, I think, is
12 interested to know, just how you intend to define just where
13 you are crossing faults when you're really in, following more
14 or less longitudinally along a system of faults that, although
15 this is a guess, from what I've read of the geological
16 literature, that it's not a single well defined feature
17 that you're crossing, but a system of splayed and faults the
18 splay off and rejoin. Yet where the pipeline is, most of
19 that fault system is covered by glacial drift and I'm not
20 aware personally of any really effective geophysical methods
21 of defining these faults. Maybe there are, and we'd be
22 interested in, not only the design, but how you are going to
23 detect these faults. It's easy enough to detect a fault
24 where you have no drift cover, but it's a different matter
25 where they're set, covered with some thickness of drift and
26 the exact trend of the fault is not known, but it is probable

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1 that there's a whole system of faults along the Trench.

2 Also our request for supplemental
3 information on pipeline-highway interactions. The Department
4 of Public Works in its, you know, realignment of the highway
5 is expected to put the highway in the best place -- best
6 possible -- design it in the best possible manner to meet
7 environmental concerns. The same constraints are being
8 imposed on you people, how often are you going to be conflicting
9 with one another and what are your mechanisms for resolving
10 these conflicts.

11 Thank you.

12 MR. CHAIRMAN: These will be
13 answered in writing, presumably, in the near future. Is that
14 my understanding?

15 MR. BOUCKHOUT: Yes, in fact,
16 the ones you have just mentioned are the ones we filed with
17 you this morning.

18 MR. CHAIRMAN: Oh, I see.

19 Okay, Dr. Beanlands has a
20 question.

21 DR. BEANLANDS: Mr. Chairman, I
22 would just like to pursue the point being raised by Dr. Hughes,
23 although it may not seem so at first. I am referring to the
24 extent to which other activities in similar terrain have been
25 looked at. We've heard a lot of reference to the regeneration
26 for example, on the Canol and associated pipelines, and the

1 pipeline from Haines to Fairbanks. I don't really think
2 that's too relevant to the kind of operation we're going to
3 be getting involved with in a forty-eight inch buried pipe-
4 line. I think it might be far more relevant to look at some
5 of the forestry operations in the area, because they have
6 come up with a far more -- or resulted in a far more surplus
7 damage to vegetation and expose a lot more mineral soil.

8 I don't think that there was
9 the same amount of mineral soil exposed in running a four or
10 eight inch pipeline on the surface, as we're going to have
11 with a series of crews in a pipeline operation, which sort
12 of follow each other. I think there's what ten or twelve
13 different crews that have a specific activity and it occurs
14 to me that with the lot of vehicular traffic, probably
15 track vehicles, or rubber tired vehicles, or whatever, you're
16 going to run in to a lot of compaction problems. If one
17 takes the time to go over it with a few forestry officers,
18 you'll quickly learn that the major problems are regeneration
19 at least in the southern areas of the Yukon, come from the
20 logging yards where the soil gets compacted as hard as that
21 floor there. I've been in places four and five years
22 after logging operations were completed, and you can't count
23 any regening becoming up there. I'm just wondering if you
24 might like to comment on that.

25 I haven't seen any what I would
26 call acceptable reference to those problems in any of the

1 documentation which I read from Foothills.

2 MR. BOUCKHOUT: Well in terms of
3 your comments respecting compaction and so on, I don't think
4 necessarily that you can directly equate a logging operation
5 to a pipeline operation. If you were to view, for instance,
6 which I have done, the Trans-Mountain pipeline in northern
7 British Columbia. Again, this is the line which extends in
8 to the Northwest Territories and the Yukon that was built
9 conventionally, and has been revegetated, in fact, it's
10 virtually entirely revegetated. The same goes for many other
11 pipeline systems built in northern, central Alberta, British
12 Columbia, and so on. These have been successfully revegetated
13 so that it doesn't appear at least on the surface that in
14 fact there is the same kind of problem with compaction.

15 I'm not precisely sure why, but
16 it doesn't appear to be the same problem since pipeline
17 rights-of-way have been successfully revegetated without serious
18 problem. In fact, in all cases, this is not necessarily
19 being assisted, or artificially revegetated. Natural
20 invasion has taken place in many cases has taken place and
21 some the same job, although, granted it does take a long
22 period of time.

23 With respect to your comments on
24 the revegetation and what might be relevant. I believe you
25 made a reference to campsites, I'm not sure if you did or not.
26 You talked about mineral soils in any event. Perhaps the best

1 way to discuss that, and the implications of revegetation of
2 mineral soils would be to have Dr. Hartner , who is here, to
3 discuss briefly the implications of revegetation on mineral
4 soil if you wish him to do that. He is our revegetation
5 consultant and with several years of experience in the field,
6 and he could discuss these issues.

7 DR. BEANLANDS: Well, I would
8 like anybody to tell me exactly what kind of revegetation
9 you want on that right-of-way and how you plan to maintain
10 the species that you do want. It's as simple as that.

11 MR. BOUCKHOUT: The kind of
12 vegetation we want, essentially, on the right-of-way, is the
13 kind of vegetation where we're stressing root growth as
14 opposed to top growth, being that the primary consideration of
15 revegetation is soil stabilization, particularly with respect
16 to erosion control, particularly with respect to hydraulic
17 erosion control. We want a self supporting vegetative matrix,
18 one which does not require constant fertilization to
19 maintain it's viability.

20 DR. BEANLANDS: Well, I was
21 referring to the natural invasion of pine and spruce, particu-
22 larly in areas where you get mineral soil. Presumably you
23 don't want those species on the line, because of interference
24 with any visual monitoring they want, pursue over the years.
25 If you look at some of the lines, particularly on the eastern
26 end of the highway, there is quite a growth of pine and spruce

1 depending on local seed supplies and soil conditions coming
2 up on the right-of-way. Do you plan to spray for those. Do
3 you cut them, or -- ?

4 MR. BOUCKHOUT: No, where such
5 vegetation as tree growth and so on do pose a threat to the
6 normal pipeline surveillance it would be mechanically controlled.
7 In other words, cutting, or whatever.

8 DR. BEANLANDS: So you're going
9 to put some sort of vehicles on the vegetation that you've
10 got established to remove the trees that you don't want?

11 MR. BOUCKHOUT: Essentially, yes.
12 The tree growth of course is a very slow thing. You don't
13 suddenly one year have no trees and the next year have a full
14 growth of trees on your right-of-way. It's not a massive
15 control effort that's necessary to control the growth of trees
16 on the right-of-way. It's a matter of normal right-of-way
17 maintenance and the kind of equipment you would use would
18 not necessarily have to be any large scale equipment either,
19 because you don't wait until the tree is ten inches
20 or anything before you go in and nip it off. You control it
21 as a normal part of pipeline right-of-way maintenance.

22 DR. BEANLANDS: I wouldn't write
23 off the regenerative capacity of the major species of pine
24 and spruce there. The following establishment, which sometimes
25 can be quite a while, depending upon the nursery crop available
26 and the bare mineral soil. Growth of four to sixteen inches a

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1 year on young pine are common in Yukon.

2 MR. BOUCKHOUT: No, I agree.

3 I agree.

4 DR. BEANLANDS: But I was
5 following up Dr. Hughes comment, that I -- again I'm not
6 saying that you haven't considered it, but a lot of these
7 perhaps very basic questions that come to mind are lost in
8 the hundreds of thousands of pounds of seeds that have been
9 grown and so on and so forth. Well, all that's quite fine
10 and good if some of the more mundane difficulties of operating
11 vehicles on the right-of-way where you are trying to grow
12 vegetation and trees invading and so on are tackled as well.
13 I just thought I would bring it up. It sort of supported
14 Dr. Hughes' concern.

15 MR. ELWOOD: Mr. Chairman, if I
16 may say something on a point of clarification here with
17 respect to compaction of the soil and the effect it might
18 have then on regrowth, I'm not by any means a soils or
19 vegetation expert, but I do know that the pipeline construction
20 industry went through this lesson about twenty years ago. Ever
21 since that date what we have been doing is stripping the
22 topsoil where there is some, stockpiling it, doing the
23 construction, and replacing the topsoil for the purpose of
24 avoiding compaction of that. That is common practice. I
25 don't think we've made any specific write-up of it.

26 DR. BEANLANDS: Perhaps if you

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1 had, I wouldn't have asked the question. It's dangerous to
2 make any presumptions in this game in terms of who's going to
3 do what.

4 MR. ELWOOD: I just note that our
5 legal counsel pointed out that that matter was covered in the
6 overview which we gave this panel.

7 MR. CHAIRMAN: Okay, one more.

8 MR. SCHILDER: It's my
9 recollection that I haven't had, or I haven't read within
10 your application and relevant material any specific
11 explanation how the topsoil, or how the first, or top
12 organic layer is really going to be handled. That is also
13 one of my concrete questions.

14 MR. ELWOOD: How is it to be
15 handled?

16 MR. SCHILDER: Yes. Within the
17 right-of-way, of course.

18 MR. ELWOOD: Wherever there is
19 sufficient material on the top to make it worthwhile saving,
20 generally in areas where you have no bedrock and so on, it's
21 stripped off with a bulldozer and stockpiled on one side of
22 the right-of-way, and then brought back with bulldozers or
23 a mormon board, or graders.

24 MR. BOUCKHOUT: I might add a
25 couple of points to this revegetation via seeding is not the
26 only method of revegetation. We are, in fact, exploring the

1 potential for revegetation via methods known as stolinization,
2 which essentially means you take species such as quack grass
3 which propagates by underground stems as opposed to seeds.
4 I'm sure most of you are familiar with this, and simply
5 shred up the material which then cuts up to stolens, which
6 are these underground stems, and each section of stolen
7 generates new plants, so that we are additionally and will
8 be, in fact, introducing shrubs in certain areas. Particularly
9 on river banks, where again, stabilization is the prime
10 concern. So introduction of shrubs, Shepherdia being an
11 example would be a control mechanism in certain locations.

12 Again, as I say, particularly
13 where you are looking at deep-seeded soil stabilization
14 requirements.

15 DR. BEANLANDS: I understand
16 that on the Pointed Mountain line, there was some aerial
17 seeding done. Is that a possibility on the Yukon route?

18 MR. BOUCKHOUT: Yes, it is a
19 possibility. Additionally -- depending on what you mean by
20 aerals, you mean aerial aircraft seeding, certainly. It is
21 a possibility.

22 DR. BEANLANDS: Do you have any
23 idea how often you may have to apply herbicides to control
24 the vegetation to your requirements on the right-of-way?

25 MR. BOUCKHOUT: We don't intend
26 to apply herbicides at all. As I said --

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1 DR. BEANLANDS: Over twenty-five
2 years?

3 MR. BOUCKHOUT: Well, as I said,
4 our current plans and perhaps Mr. Elwood could give me a bit
5 of help on that in terms of experience with vegetation growth
6 on trunk line right-of-ways, but our current plans are not
7 to control vegetation by herbicides.

8 MR. ELWOOD: Yes, the experience
9 we have had with operating pipelines in Alberta is that they
10 have used herbicides both there and in B.C. to keep the growth
11 down. We also use a mechanical process, just a large heavy
12 duty mower which is taken up and down the right-of-way to
13 cut the shrubs. The frequency of this may be in the order of
14 five years, depending on the area that you're in, less than
15 that if you're in an area where growth is somewhat faster or
16 heavier.

17 DR. BEANLANDS: That jibes with
18 the references by the chap from Haines Junction, when he was
19 referring to about every four or five years that the Army
20 had to apply herbicide to the line from Haines to Fairbanks.

21 MR. BOUCKHOUT: I wouldn't
22 categorically say that at this stage herbicides would never
23 be used. If it were ever intended to use herbicides,
24 obviously we would have to pass that concept via the appropriate
25 regulatory authorities. But currently our concept is to
26 utilize mechanical means of controlling growth.

1 MR. CHAIRMAN: Well, I would like
2 to call an end to today's session.
3
4 We'll remeet tomorrow at one
5 thirty, where we will resume of schedule of briefs. Thank you
6 very much.

7 (PROCEEDINGS ADJOURNED)
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